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BIRD ENEMIES OF FOREST INSECTS

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BIRDS may be called health officers for our trees. Wherever unhealthy conditions prevail as a result of insect attacks, birds are sure to discover them and to do something toward improving the situation. As surgeons examine human bodies for evidences of disease and remove the cause, so birds tirelessly scan the trees from top to base, detecting insects and devouring them. As there are specialists among the surgeons, some paying particular attention to one part of the body and others to another, so with the birds in their relations to trees.

The ground feeding birds as the wild turkey, grouse, chewinks, wrens, and thrushes, search the leaf strewn forest floor and devour many insects injurious to the trees. The woodpeckers clamber about over the trunks and larger branches, detect their prey beneath the bark and dig it out. The creepers and nuthatches frequent the same parts of trees, closely inspecting crevices in the bark, which may yield some insect tidbits. The titmice, chickadees, and kinglets choose for their hunting grounds, the smaller branches, twigs and buds, where may be found the small insects and their eggs of which these little birds are so fond. The cuckoos, orioles, vireos and warblers closely examine the leaves, and prey upon the larvae and sucking insects so abundant there. The humming-birds, with some assistance from other small species, prey upon insects frequenting flowers. Moreover, the birds which feed upon or about trees are not the only ones that benefit them by devouring their insect foes. When these insects take to flight, they are likely to be snapped up by the flycatchers, and when, as frequently happens, they form large migratory swarms, they are preyed upon voraciously by the nighthawks, swifts, and swallows.

A large number of birds participate in the destruction of forest insects, and it is fortunate that this is the case, for the insect foes of trees are legion. More than 500 different kinds of insects are known to live upon a single species of tree, and the number of individuals of these pests that are sometimes present is practically infinite. Bark infesting insects are among the most destructive enemies of the forest; they have been known to kill almost every tree of certain species over hundreds of square miles. Wood borers hasten the decay and disintegration of trees and are especially injurious to shade trees; leaf-feeding insects frequently strip trees or make them appear as if scorched by fire, and, in some cases, have threatened to destroy all of the trees upon which they feed over vast areas. The total damage to trees by insect pests is enormous, and several years ago was estimated to exceed $110,000,000 annually. Not only is the damage extremely large, but the difficulties of directly combating insect pests in forests are so great that man is able to do comparatively little. The services of natural enemies of the destructive insects should therefore be highly appreciated. If they serve to reduce the damage by only a small percentage, the gain to the country is a very large sum. Among these enemies, birds are conspicuous. Their services are well known and have long been acknowl-

edged. No reasons have thus far developed for considering any other group of the natural enemies of forest insects in general, more important than birds.

Birds are known to destroy large numbers of bark beetles. These small beetles are among the most important pests of our forests. They feed just beneath the bark, forming tunnels which in many cases girdle and thus kill the trees. Few forest foes cause so great damage. The spruce-destroying bark beetle has been responsible for the loss of many billions of feet of timber in the northeastern United States. Dr. A. D. Hopkins, of the U. S. Bureau of Entomology, who made a special study of this insect and its work, gives birds much credit for devouring it. He says "The principal enemy of the spruce destroying beetle, and otherbark-infesting enemies of the spruce, consists of the woodpeckers, which destroy, it is believed, from 50 to 75 per cent of the broods of the spruce beetle in many hundreds of trees each year." Mr. J. L. Webb, of the same Bureau, gives similar testimony regarding the western pine-destroying bark beetle, reporting that woodpeckers had evidently destroyed a large percentage of the insects in some of the trees." More than forty-five species of birds are known to feed upon bark beetles, and some of them occasionally eat large numbers of the insects. For instance, no fewer than twenty-three of one species of bark beetle were found in the stomach of so small a bird as the chimney swift, and in single stomachs of the hairy woodpecker, fifty have been found. The nighthawk and the chimney swift catch bark beetles while they are in flight, and usually no doubt when they are extending their ranges. No fewer than eighteen species of bark beetles have been taken from stomachs of the nighthawk and nineteen from the chimney swift.

FIVE THOUSAND ANTS FOR ONE MEAL

IT IS SEEMINGLY INCOMPREHENSIBLE BUT NEVERTHELESS TRUE THAT THE FLICKER, ONE OF THE LARGEST AND BEST KNOWN OF OUR WOODPECKERS, OFTEN EATS AS MANY AS 5,000 ANTS TO SATISFY ITS VORACIOUS APPETITE FOR ONE MEAL. IT ALSO EATS MANY OTHER INSECTS AND WAGES STEADY AND ENERGETIC WARFARE ON INSECTS WHICH ARE DESTRUCTIVE TO TREES

Other beetles that are among the most destructive enemies of trees are the round-headed and flat-headed wood-

borers. Their work is similar to that of the bark-beetles in that their excavations under the bark frequently result in girdling the trees. The larvae of these beetles are the especial prey of woodpeckers; all kinds of woodpeckers eat them and usually as a regular article of diet. The three-toed woodpeckers, of which there are two species inhabiting the northern part of the country, are very fond of these larvae and make of them no less than three-fourths of their entire food. The hairy woodpecker also has a great relish for wood-boring larvae, and from a score to more than four score of the borers have been taken at a meal by single birds. The flat-headed apple tree borer, a pest in various parts of the United States, is eaten by the downy woodpecker. Prof. R. A. Cooley, of the Montana Agricultural Experiment Station, says of this bird: "Besides picking up miscellaneous pests, it locates the burrows of this borer and extracts them in considerable numbers. In the older orchards of Montana scarcely a tree can be found that does not bear the marks of woodpeckers, a large proportion of which are made by this species."

RED HEADED WOODPECKER

THE UPPER IS THE ADULT BIRD, THE LOWER THE YOUNG BIRD. THE WOODPECKER FAMILY TAKES THE LEAD IN THE DESTRUCTION OF ENEMIES OF THE TREES

Certain kinds of caterpillars also bore timber, and one kind in particular, that of the leopard moth, is very destructive to shade trees. In various localities, it has been noted that this species is held in check by native birds. "No other explanation," says Dr. W. E. Britton, "can be given of the scarcity of the leopard moth in the country, adjacent to infested towns, except the presence of insectivorous birds. * * * Mr. James Walker, of Newark, N. J., states "that infested elms placed in a nursery outside the city limits of Newark were rid of the larvae by woodpeckers."

The work begun by the wood-borers is continued by ants. Trees that would otherwise have value, at least for firewood, are hollowed out by ants until they are mere fragile shells, ready to topple over at the first storm and of no value whatever. The ants that do this work in the United States are mostly the large black species, frequently known as carpenter-ants. They have a host of bird enemies. Fully fifty species of birds are now known to eat

them, and they sometimes take large numbers. About 600 of these large ants have been found in the stomach of single individuals of the red-shafted flicker and the pileated woodpecker, and about 1,000 in the stomach of a nighthawk. Woodpeckers are exceptionally fond of ants, certain species of this family in the United States making as high as 85 per cent of their food of ants and the whole group averaging nearly 30 per cent.

THE BLUE JAY

THIS BIRD NOT ONLY EATS TREE INSECTS BUT PLAYS A VERY USEFUL ROLE AS A TREE PLANTER BY DISTRIBUTING QUANTITIES OF TREE SEEDS. JAYS INCLUDE IN THEIR INSECT MENU THE LARVAE OF THE DESTRUCTIVE GYPSY MOTH AND THE EGGS OF THE BROWNTAIL MOTH AND THE TENT CATERPILLAR

Various caterpillars must be ranked among the greatest pests of our trees. It requires no more than mention of a few species such as the tent caterpillar, the gypsy moth and the browntail to emphasize this fact. Inspite of the expenditure of enormous sums of money annually in combating these insects, they remain pests of the first rank, and cause damage that can be reckoned only in millions of dollars.

Their natural enemies consequently are of great interest, and among them birds are by no means least. No fewer than forty-six kinds of birds are known to feed upon the gypsy moth, in some of its stages, and thirty-one upon the brown-tail. Forty-three birds are numbered among the enemies of the orchard tent-caterpillar and thirty-two for the forest tent-caterpillar. In some cases the birds have been conspicuously successful in destroying these pests. Mr. E. H. Forbush, State Ornithologist of Massachusetts, says: "Instances were recorded during the first state campaign against the gypsy moth, from 1890 to 1895, where small isolated moth colonies appeared to have been suppressed and even annihilated by birds. A serious outbreak was discovered in Georgetown, Mass., in 1899. It had been in existence for a long time, but its spread had evidently been limited by the great number of birds that were feeding there on all forms of the moth. Several months later the state abandoned the work against the moth, and little hope was entertained that anything more than a severe check had been given the insect in Georgetown. Nevertheless, in the six years that have since elapsed comparatively few moths have been found in that locality. The most feasible explanation seems to be that

up to 1906 the birds have kept the numbers of the moths below the point where they can do appreciable injury."

How birds are able to accomplish such results may be better understood by considering the following observations of Messrs. Mosher and Kirkland, also reported by Mr. Forbush: A yellow warbler ate fifteen caterpillars of the gypsy moth in less than five minutes; a scarlet tanager ate upwards of thirty caterpillars within 5 minutes; two scarlet tanagers together ate small caterpillars at the rate of thirty-five a minute for 18 minutes; a crow blackbird ate forty caterpillars in a little over 3 minutes; a red-eyed vireo ate seventy-three in 40 minutes; a yellow-billed cuckoo ate eighty-one in 48 minutes. Before such enthusiastic appetites, the numbers of the most abundant insect pest must surely melt away.

Similar records for the forest tent-caterpillar are the following: A black-billedcuckoo was seen to eat thirty-six within 5 minutes; red-eyed vireos (probably a pair) took ninety-two forest tent-caterpillars from a tree within an hour; a male Baltimore oriole went into a tree infested by these caterpillars, where he stayed 4 minutes, killing eighteen caterpillars in that time, coming a little later he stayed 7 minutes and took twenty-six caterpillars.

At Ogdensberg, New York, Mary B. Sherman made the following observations on the warfare of birds against the forest tent-caterpillar: "The town is full of birds, and they are doing good work. * * * The English sparrow has been eating the forest tent-caterpillars, and last summer they attacked the cocoons and fed on the moths. We have an unusual number of orioles which I have seen feeding on the caterpillars. I have also seen the yellow and several other warblers, the yellow-billed cuckoo, the robin, the cedar waxwing, and I believe, the house wren feeding on the caterpillars. The maples in front of the house have been filled

THE HAIRY WOODPECKER

THIS BIRD WITH ITS LONG SHARP BILL FOR DIGGING INSECTS, EGGS AND LARVAE FROM BENEATH THE BARK OF TREES FEEDS LARGELY ON WOOD BORING LARVAE. BARK BEETLES AND GYPSY MOTHS ARE ALSO DESTROYED BY IT

with warblers, all of which were very busy with the trunks and branches. * * * We have practically no forest tent-caterpillars. * * * They hatched in large numbers, but the cold evidently killed many, and the birds appeared to have cared for the remainder."

BLACK-CAPPED CHICKADEE AND BROWN CREEPER

THE CHICKADEE ON THE UPPER BRANCH AND THE CREEPER ON THE TRUNK OF THE TREE ARE AMONG THE MOST IMPORTANT OF THE INSECTIVOROUS BIRDS. THEY CLIMB OVER TRUNKS AND BRANCHES SCANNING EVERY INCH OF THE SURFACE FOR INSECTS THAT ARE CONCEALED IN THE BARK

All of the caterpillars mentioned above are hairy kinds, which, it is often asserted, are avoided by birds. The evidence makes it clear, however, that this is not always the case. Cuckoos in particular are fond of these hairy larvae. How a pair of cuckoos extirpated a colony of destructive walnut-caterpillars is recounted by America's foremost Ornithologist, Robert Ridgway.

"We first noticed the caterpillars something like two weeks ago, our attention being attracted to them by noticing several branches which had been stripped of their leaves. We then discovered the caterpillars in clusters on the twigs and foliage and a little later a compact mass of them, about a foot long by 6 inches wide, on the bark of the trunk, a foot or so from the ground. Within a day or two of our first discovery of the pests, we saw a yellow-billed cuckoo in the tree, busily engaged in eating the caterpillars. Later this was joined by another (probably the mate) which, however, only made occasional visits to the tree, its time being doubtless mainly occupied with incubating or brooding. The other cuckoo practically *lived* in the tree, being very seldom absent, even for a short time, and was so persistent in his destruction of the caterpillars that whenever one fell to the ground he would immediately follow it and then dispatch and devour it; and later when few were left on the tree we saw him carefully searching the ground beneath. The result of the work of these two cuckoos (principally one of them) was that within a week the colony of caterpillars was absolutely exterminated, and I have not been able to find one in the neighborhood." (July 30, 1906.)

There is no doubt about the liking birds have for smooth caterpillars, and one of the most common and injurious groups of these larvae—canker worms—are known to be eaten by more than fifty species of birds. In California, the Brewer blackbird is a serious foe of canker worms and has been credited upon several occasions with clearing orchards of the pests. In Massachusetts, the Baltimore oriole has been observed to achieve the same desirable end. Orchardists should be grateful indeed when birds as beneficial as these make homes among their trees.

Another smooth caterpillar of almost historical importance is the larva of the snow-white linden moth. These larvae known as drop-worms became excessively abundant in some of the larger eastern cities from 1850 to 1870 and were the subject of voluminous comment in the press. It is said that the English sparrow was introduced for the purpose of suppressing this insect, and as Prof. G. W. Herrick relates "so well did this bird do its work that for nearly a half century we have heard almost nothing about this insect as a shade-

BLACKBURNIAN WARBLERS

THE WOOD WARBLERS ARE A LARGE FAMILY OF SMALL BIRDS FOUND NOWHERE OUTSIDE OF THE AMERICAS. THEY ARE FOND OF PLANT LICE, SCALE INSECTS AND OTHER SMALL BUT OFTEN DANGEROUS ENEMIES OF TREES

WHITE BREASTED NUT-HATCH

A BIRD WHICH DEVOTES ITSELF TO FINDING INSECTS, THEIR LARVAE AND EGGS WHICH ARE CONCEALED IN CREVICES IN THE BARK OF TREES

BLACK AND WHITE WARBLER AND AMERICAN REDSTERT

THESE BIRDS ARE BOTH STRICTLY AMERICAN IN DISTRIBUTION AND WHILE THEY ARE NOTED FOR THEIR SWEETNESS OF SONG AND BRILLIANCY OF PLUMAGE THEY ALSO DO GOOD SERVICE IN TREE PROTECTION, SPECIALIZING ON SMALL INSECTS CONCEALED IN THE BUDS AND LEAVES

A PAIR OF YOUNG WHIP-POOR-WILLS

THESE BIRDS ARE CHARACTERISTIC OF ROCKY, WOODED LOCALITIES AT RATHER LOW ELEVATION. THE MATURE BIRDS FEED ON LARGE MOTHS AND BEETLES INCLUDING MANY LEAF-CHAFERS

tree pest. * * * One of the most remarkable phases of this pest were the flights of great swarms of the snow-white moths. * * * In New York City, the effect was compared to a snowstorm in midsummer. Myriads of moths fluttered about the electric lights. Dr. John B. Smith says that on the evening of July 17, Newark, Elizabeth, and Paterson, N. J., had the same experience. On the morning after the flight, however, nothing remained except great numbers of snow-white wings without bodies, showing the work of the English sparrow. *** The testimony regarding the activity of the English sparrow in exterminating this pest in cities seems to show rather conclusively that this much-disliked bird did actually bring about the destruction of this insect. Nearly every writer on the snow-white linden moth makes acknowledgment to the sparrow and declares that the cities owe their freedom from this insect to that bird."

YELLOW BILLED CUCKOO

THIS IS AN IMPORTANT INSECTIVOROUS BIRD. IT SPECIALIZES ON THE HAIRY CATERPILLARS AND THESE CONSTITUTE ABOUT HALF ITS FOOD WHEN THEY CAN BE OBTAINED. FALL WEBWORMS, TUSSOCK, GYPSY AND BROWNTAIL MOTH LARVAE ALSO ARE OFTEN EATEN AND THE BIRD IS MOST VALUABLE AS A PROTECTOR OF TREES

The writer has seen English sparrows doing the same kind of work on the brown-tail moth, the whole pavement on blocks near electric lights, being littered with the wings of moths whose bodies had been eaten. We might continue to enumerate the bird enemies of caterpillar pests, such as the fall web-worm, the tussock-moth, the catalpa sphinx and others, but must pass to some of the other enemies of trees. Plant-lice infest trees of almost all

kinds, sometimes in enormous numbers. They are preyed upon by most small birds, and particularly by the chipping sparrow, goldfinch, house finch, Audubon warbler, orange-crowned warbler, downy woodpecker, Baltimore oriole, chickadees, bush-tits and kinglets.

Another group of small but nevertheless very destructive insects are the scale insects. These inconspicuous and far from edible-looking creatures were once thought to be free from the attacks of birds, but now more than sixty species of birds are known to prey upon them. The beautiful rose-breasted grosbeak feeds upon a large number of destructive insects, among them several species of scales. More than 100 scale insects have been found in a single stomach of this bird. Related grosbeaks, the cardinal, and the black headed grosbeak also are fond of scale insects. Eighteen per cent of the entire food of 120 black-headed grosbeaks consisted of black olive scales, pests which are exceedingly abundant and destructive in California. Twenty-nine species of birds are known to prey upon them. The little bush-tits depend upon scales for about a fifth of their whole subsistence.

HERMIT THRUSH AND WOOD THRUSH

BOTH OF THESE BIRDS DESERVE A HIGH PLACE AMONG THOSE WHO DESTROY INSECT ENEMIES OF TREES. THEY FEED LARGELY UPON THESE INSECTS AND ARE ALSO NOTED FOR THEIR FLUTE-LIKE TONES

Another insect which injures trees and which should not be passed unmentioned is the periodical cicada or seventeen-year locust. These insects deposit their eggs in twigs, which either die and drop off, or heal with large scars. The natural enemies of cicadas are legion, including practically all carnivorous animals. Among vertebrates, fishes and tortoises, when they have opportunity, frogs, toads, lizards, squirrels, and a multitude of birds prey upon the cicadas. The English sparrow especially is a persistent foe of this insect, and in many cases it has been observed that where sparrows are plentiful, hardly

a cicada escapes them. The extermination of the insect in city parks is freely predicted because of the abundance of English sparrows in these reservations. The crow-blackbird or grakle is another bird that pursues cicadas so relentlessly that it sometimes destroys all of a brood in restricted areas.

THE NIGHT HAWK

THIS BIRD PATROLS THE AIR FOR INSECTS IN THE LATE AFTERNOON AND NIGHT. IT DESTROYS MANY FOREST PESTS AND IS KNOWN TO FEED UPON EIGHTEEN DIFFERENT KINDS OF BARK BEETLES

We have mentioned by no means all of the tree pests that have important bird enemies, but enough has been recorded to indicate that birds are the most important natural enemies of certain of these pests, and that they are of some value in combating almost all of the forest insects. Their great value has by no means passed unrecognized. In European countries, the aid of birds has been widely invoked in controlling tree insects. In those countries where forestry has been highly developed one of its branches is the protection and increase of birds in the state forests. Hundreds, yes thousands, of nest boxes have been erected for the birds; nesting sites have been carefully preserved for those birds that will not nest in boxes; and measures have been adopted to help the birds through the hardships of winter. In England the attraction of birds by supplying a large number of nest boxes was adopted as a definite method of combating the larch sawfly.

The boxes were made of waste lumber —slab wood—at a low cost. "In the first year (1908,) sixty boxes were distributed and 31 per cent were occupied. The number of boxes was increased yearly until in 1911 there were 347 boxes of which 66 per cent were occupied." In 1913 about 75 per cent of the boxes had tenants. In addition to the provision of nesting boxes, feeding stations were erected for the purpose of holding the birds in the region during the winter. The result was a material increase in the number of birds resident in the forests attacked by the sawfly.

The method is considered entirely economical, because it is only through the natural enemies that the suppression of the pest can be expected, and if these enemies are increased in number, the outbreak will subside much sooner than otherwise, and the pecuniary loss will be correspondingly decreased.

In the case of most forest insects, direct suppression by man is impossible. This makes the work of natural enemies of the pests of paramount importance. Among these enemies birds are the most voracious, and rally the quickest to the scene of an outbreak.

PENNSYLVANIA'S FIRE LOSSES

UNUSUALLY severe forest fires in Pennsylvania during the spring did a great amount of damage. So many were the fires that it has not been possible so far to ascertain what the total loss is. The situation, in the opinion of State Forestry Commissioner Conklin is evidence of the great necessity of a larger appropriation for the State Forestry Department and also evidence of the short sighted policy of the last legislature in making the appropriation a small one and of ex-Governor Tener in further reducing it. Commissioner Conklin says:

"The Department of Forestry has always preached the doctrine that it is cheaper to prevent fires than to extinguish them. The cost is usually not much greater, and, in addition, the timber and all the other valuable things destroyed are saved.

"The forest fire law of 1909, in Section 18, provides a method for daily patrol, but this provision has been completely nullified since the passage of the law by the refusal of the Legislature to appropriate sufficient money to place men upon daily patrol. A patrol of the highly dangerous regions, which, in the experience of the department, results in the quenching of many fires in their incipiency, would cause careless users of fire in the woods to be more cautious, because of the fact that a patrol is kept. Five minutes work at a fire at its beginning is worth days of labor put in after the fire has once obtained a great headway.

"All danger regions of the State are equipped with Forest Fire Wardens and Assistants, but they cannot go upon daily patrol for want of money to pay them. The appropriation which is allowed the department for this purpose must be skimped out to the very end, and it takes all of it and sometimes more to pay the wages of the men who are actually employed to extinguish fires. The last two Legislatures had to be appealed to for deficiency appropriations.

"The Department is asking this year for a forest fire appropriation of $150,000. Of course, what is not needed will not be expended, but we must have a fund with which to patrol danger points for the prevention of fire if we are ever to make any great headway against fire in the woods.

"A comparison of the appropriations which Pennsylvania has made for this purpose with that made by other States is instructive at this time. In Massachusetts and New York an annual appropriation of 1 cent per acre for forested land for protective purposes was made. At this rate, the 7,500,000 acres of similar Pennsylvania land would require $150,000, or $75,000 per year. Because of adequate protection Massachusetts was able to limit the average area of each fire to 11 acres, and New York to eighteen; but in the case of Pennsylvania the average mounts to 508 acres per fire."

A JULY FEATURE

"THE WAR'S EFFECT ON RUSSIAN FORESTS"

Will be graphically described in the July issue of American Forestry by Stanley Washburn, the famous war correspondent of the London Times, who is at the front with the Russian Army.

In the article is a thrilling word picture of a frightful battle in a dense forest.

FORESTS OF JAPAN

By NILS B. ECKBO, M. F.

[The statistics for this article were obtained through the courtesy of the Hon. M. Kamiyama, Director of the Forestry Bureau, Tokyo. Other information was gathered on a two months' tour through the various forest regions of the country, by the author and a friend. The article includes the substance of an address delivered by the author before the Society of American Foresters on March 4, 1915—EDITOR.]

THE itinerary of the tour of the forest regions of Japan, which was made by K. R. McGuffey and myself, was planned by the Director of the Forestry Bureau at Tokyo. It embraced visits to a number of the more important "Minor Forests," where it would be possible to obtain a good idea of the general administration and the various phases of forest activities. Japanese letters of introduction were provided to all forest officers concerned, and an interpreter was placed at our free disposal on the main island. The Governor of Hokkaido rendered the services of a forest expert in addition to an interpreter, while traveling in the northern part of the country. The accommodations obtained away from the lines of beaten travel were intensely interesting. The country inns and farmhouses, where we had to stop, were all highly primitive and built of thin boards or straw; but they were all exceedingly cleanly, regardless of the limited circumstances of the owner. The sleeping quarters consisted usually of a mattress thrown on the floor, and the menu contained delicacies like laquer bowl soup, raw fish, bamboo sprouts and rice, etc., and if our luck was particularly good, we might relish chicken and eggs.

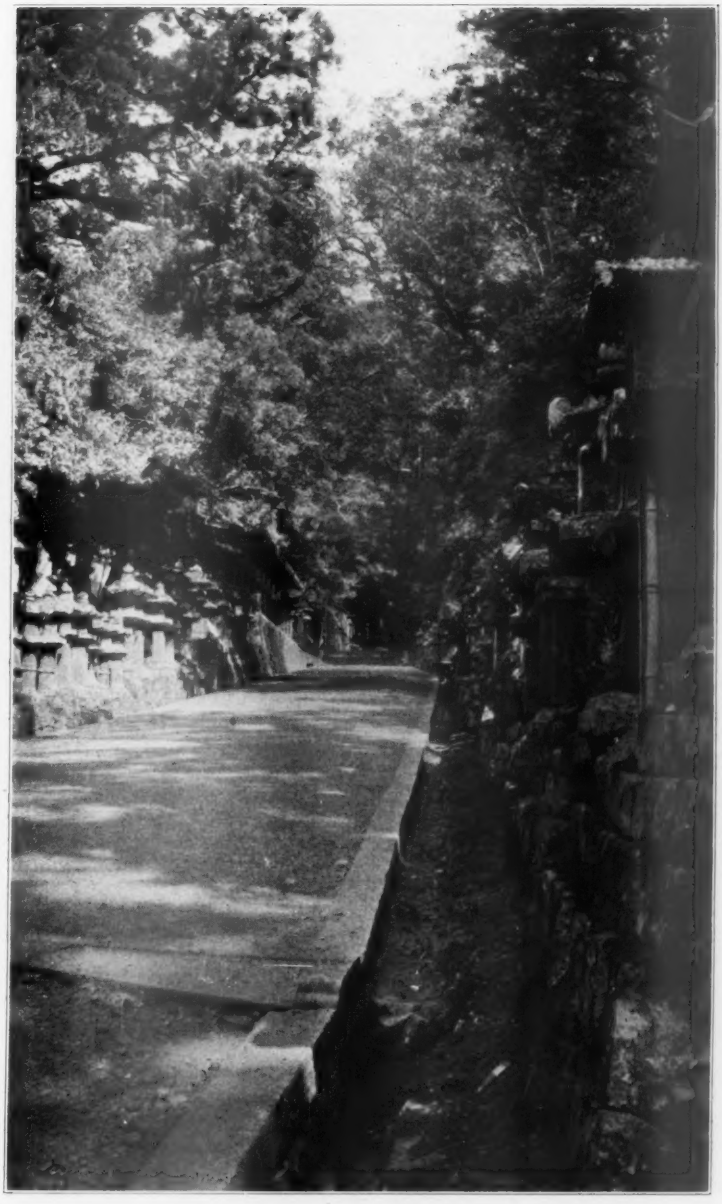
MEGURO EXPERIMENT STATION

THIS WELL DEVELOPED STATION IS NEAR TOKYO. ON THE LEFT IS THE DIRECTOR; THE INTERPRETER IS IN THE CENTER AND K. R. MACGUFFEY, WHO ACCOMPANIED THE WRITER, IS EXAMINING THE SEEDLINGS

SCHOOL OF FORESTRY, SAPPORO, HOKKAIDO, JAPAN

The local forest officers were always most courteous and conducted the excursions to our great benefit, and with credit to themselves.

Japan is mountainous with numerous volcanoes, the highest peak, Fujiyama, reaching an elevation of 12,370 feet. The mountains are swept by dry winds from the continent on one side and the moist air currents from the Pacific Ocean on the other. Owing to these factors the country has a variety of climates varying from a tropical one in Formosa to a frigid climate in Hokkaido. As a natural consequence of the climatic conditions and the great amount of rainfall, Japan has as rich a flora as any country in the world. About 56,125,000 acres, or 59 per cent of Japan proper, is covered with forests and the country is said to have not less than 800 different forest trees. Of this number, however,



ROADWAY TO A TEMPLE

THIS IS IN SOUTHERN JAPAN. NOTE HOW THE ROADWAY IS LINED WITH TREES OF SEVERAL VARIETIES OF WHICH GREAT CARE IS TAKEN

NURSERY IN NORTHERN JAPAN
IN THE LEFT MIDDLE GROUND IS A STACK OF STRAW MATS. THESE ARE USED FOR SHIELDING THE YOUNG SEEDLINGS FROM THE HOT SUN AND ALSO IN INCLEMENT WEATHER

only twenty species are important from an economic point of view. In spite of this great percentage of forest land, Japan has not enough timber for its own supply and the exportation of valuable hardwoods is more than equalized by the cheaper grades imported.

The principal trees among the conifers are pine, fir, spruce, sugi, Hinoki and Hiba.

The principal trees among the broad-leaved species are birch, several varieties of oak, beech, chestnut, maple, cherry and ash.

The forests can be divided naturally into four zones; tropical, sub-tropical, temperate and frigid.

The forests are classified according to ownership as follows:

Crown Forests	1,775,000 acres
State Forests	10,850,000 acres
Public Forests	12,250,000 acres
Temple Forests	850,000 acres
Private Forests	30,400,000 acres
Total	56,125,000 acres

The forests of Hokkaido and Formosa are not included in the above classification, because they are managed entirely by the local governments.

The Crown Forests are subject to the control of the Department of Imperial Household.

The State Forests are under control of the Department of Agriculture and Commerce of which the Forestry Bureau is a branch. The administration is regulated by the Law of State Forests and Unused Land of 1899, but the Forestry Bureau itself was founded by virtue of an Imperial ordinance of 1886.

The forests belonging to public corporations, temples and private individuals are subject to the supervision of the Department of Agriculture and Commerce in accordance with the provisions of the Forestry Law. This law was passed in 1897 and provides rules regarding the management of timberland in general.

Regardless of ownership the forests of Japan are divided into two classes, Reserve Forests and Utilization Forests.

The Reserve Forests include timbered areas necessary for local demand, watershed protection, and the public welfare in general, and are subject to restrictions regarding cutting, in accordance with the provisions of the Forestry law. At the present time, the Reserve Forests cover about 2,200,000 acres.

The Utilization Forests consist of the remainder of the timberland, or about 53,925,000 acres. This area is subject to no restriction whatever, and is managed with the object of producing the greatest possible revenue for all times to come.

With the exception of the forests belonging to the Imperial Household and those in Hokkaido and Formosa, the forests of Japan are under jurisdiction of the Minister of the Department of Agriculture and Commerce.

The supervision of the forests belonging to public corporations, temples and private individuals is vested in Governors, Chief Magistrates, Municipal Councils, and Chief Officials of towns and villages by authority of the Minister, and they are responsible to him.

The administration of the state forests rests with the Minister of Agriculture and Commerce, but the execution rests with the Director of the Forestry Bureau.

The Forestry Bureau is located at Tokyo and all applicants are subject to a higher and lower Civil Service Exam-

THE SACRED SUGI TREE AND HOUSE OF WORSHIP

A Forest Ranger Station

HOWEVER POOR THESE FOREST RANGER STATIONS MAY BE IT IS NECESSARY FOR ALL PERSONS TO REMOVE THEIR SHOES BEFORE ENTERING THEM

ination before entering the Forestry Bureau. The officials constituting the personnel of the Forestry Bureau and the field force consists of twenty Secretaries, twenty-three Assistant Secretaries, and eighty-two experts in the higher civil service; and 1,426 clerks and assistant experts, and 1,321 forest inspectors and rangers in the lower civil service. Of these 2,079 are under the Department for Ordinary Expenditures and 668 under that of Extraordinary Expenditures.

This makes a total of 2,272 permanent employes. Besides this number there are 354 foresters connected with prefectoral governments. The 10,850,000 acres of State Forests are divided into ten Major Forest Districts containing on an average 1,085,000 acres. These districts are in turn divided into 211 Minor Forest Districts—National Forest—with an average of 51,420 acres. The Minor Forest Districts are subdivided into 1,314 Protection Districts—Ranger Districts—which will average 8,257 acres.

As stated previously, the area of the State forests comprises 10,850,000 acres. Part of this land is unfit for State Administration, and some areas are better suited for agricultural purposes than forestry. The total area of this land is 1,150,000 acres, and is set apart as "Unnecessary Land" and is sold to local corporations or individuals.

The remainder of the land, or 9,700,000 acres, is divided into 8,775,000 acres of land with trees and 925,000 acres of land without trees, rocky, etc.

On account of lack of transportation facilities some of the forests have not been expoilted at the present time. To be more specific, 5,725,000 acres have been exploited and 3,050,000 acres are yet unexploited.

A Group of "Ainoes" of Northern Japan

DESCENDANTS OF THE ORIGINAL INHABITANTS OF JAPAN. THEY ARE A POWERFULLY BUILT RACE SPLENDIDLY ADAPTED TO WOODWORK

COUNTRY INN AND TEA HOUSE

ONE OF THE MANY FASCINATING PLACES TO BE FOUND ALONG THE LINES OF TRAVEL IN SOUTHERN JAPAN. HERE THE WAYFARER GETS EXCELLENT ACCOMMODATIONS

The administration of the State Forests is divided into two departments, Extraordinary Affairs and Ordinary Affairs.

By the means accruing from the sale of unnecessary land, the department of Extraordinary Affairs is practically limited to the unexploited areas, and does the following work:

Sale of Unnecessary Land:—The proceeds of the sales, which are estimated at $11,500,000, are set aside as a "Forestry Fund."

Adjustment of boundary lines and surveying of forests belonging to the State:—The aim of this work is to distinguish definitely those forests which belong to the State and to determine the exact area.

Organization of Enterprises:—This section makes working plans for the most valuable forests.

Silvicultural Work:—This includes the improvement of land without trees, nursery work, planting and checking driftsand, etc.

Purchase of Land:—This section undertakes the purchase of land which is deemed necessary for the proper administration of the State Forests and their preservation.

The department of Ordinary Affairs undertakes the work in exploited forests and includes the local force. The main duties of the force are:

Exploitation by Felling:—There are two ways of disposing of the timber, namely, sale of the standing trees or the sale of logs when the logging is done by the Government. The standing trees sold in 1906–1907 totaled 48,792,000 board feet; and in 1907–1908, 42,696,000 board feet. The trees cut by the Government in 1906–1907 totaled 8,496,000 board feet and in 1907–1908, 18,444,000 board feet.

Silvicultural Work:—While planting on the treeless areas comes under Extraordinary Affairs, planting after felling and in the forests in general comes under Ordinary Affairs.

Forest Police:—All forest officers are to serve as police on the forests. The following is a table showing the "Ordinary Forest Revenue" and expenditure for three consecutive years:

	Yen Ordinary Revenue	*Yen* Ordinary Expenditure	*Yen* Ordinary Surplus
1906–1907	2,573,456	1,012,543	1,560,913
1907–1908	3,859,200	1,488,279	2,370,921
1908–1909	5,884,309	2,605,097	3,279,212

JAPANESE WOOD CHOPPER
THIS MAN IS AT WORK IN THE UTCHIMAPPU MINOR FOREST. NOTICE THE SHORT SAW AND THE WEDGE SHAPED AXE

Of the most important forests visited can be mentioned the Owani, Utchimappu and Odate Minor Forests, besides the large areas under the Governor of Hokkaido. They are all located pretty well north and their most valuable trees are sugi and hiba on the main island and pine and fir on Hokkaido.

The forests are well covered by intensive working plans furnishing detailed maps and estimates, besides prescribing a fixed annual cut and so forth. The Owani Minor Forest, for

UNLOADING BABY CAR
THESE ARE MUCH USED IN LUMBERING OPERATIONS. THIS PHOTOGRAPH WAS TAKEN ON THE ODATE MINOR FOREST JAPAN

example, with an area of 26,215 acres and a total estimate of 600 million feet B.M., cuts annually, on a 100 to 120 year rotation, according to Commander C. Omikiyama, 7.2 million feet; which is twice the amount prescribed by the working plans, due to the economic conditions of the country at the time. This forest is divided into seven cutting districts and fifty different forest types, which are all shown on the map. A complete map and estimate had been prepared of the first division of the Utchimappu on an intensive scale. A total area of 8,011 acres had been covered, and each tree calipered at an aggregated cost of 40 cents per acre. On the second division of the same forest, the cost was reduced to 25 cents per acre, and on still another area it took twenty men ten months to survey 12,900 acres of timberland.

Reconnaissance on the National Forests in the United States usually covers less than 10 per cent of the area, an expense rarely exceeding 5 cents per acre. While it is far from my intention to advocate similar 100 per cent work in this country, I think it is particularly interesting to note that the Japanese Government realizes the value of the work to such an extent, and feels justified in authorizing this large expenditure, where stumpage values are only twice as high as in this country.

All trees are marked prior to cutting. One of the marking tools has an embossed Japanese steel insignia on one end, and is heated so as to burn the brand into the wood.

The most accessible forests are reproduced artificially. This is the case on the Odate Minor Forest, where they cut clear, burn the area and plant; but both Utchimappu and Owani Forests as well as the forests on Hokkaido depend mainly on natural reproduction. They attempt to attain the latter through various systems of cutting and soil preparation. On the Utchimappu, where the forest consists principally of a pure stand of hiba, the Shelterwood

JAPANESE SAWDUST CONVEYOR

HERE IS THE ODATE GOVERNMENT SAW MILL. THE SAW DUST IS SWEPT DOWN A HOLE IN THE FLOOR, WOMEN CATCH IT IN BAGS AND CARRY IT AWAY

Compartment System is applied successfully. On the Owani, where sugi and hiba predominate, good results were obtained under favorable circumstances, with two cuttings. In the first about 50 per cent would be cut and the rest left to seed up the ground, and when this had been accomplished the second half would be carefully removed. In more valuable timber a system is used with three cuttings:

Preparatory cutting, which is only a light thinning.

Seed cutting, which comes five years later and removes 50 per cent of the remaining stand.

Clear, or final cutting, which takes place fifteen years after the second cutting. Between the second and third cutting, it is sometimes necessary to make thinnings to aid natural reproduction, and all areas imperfectly reproduced after the third cutting are restocked artificially. On Hokkaido it had been found worth while to remove all cover in rows about 1 foot wide and 6 feet apart besides stirring the soil thoroughly, in order to gain the desired result.

Before any sale of timber can take place, the tract must be carefully investigated by the Minor Forest Officer. Guided by the working plan, he recommends the trees to be sold on the stump, or possibly advocates the logging and manufacture by the Government, as the case may be. Dead or injured trees not to exceed a value of $150 may be sold by him; but all larger sales must be approved by the Major Forest Officer.

An agreement is entered into with the operators providing perfect utilization, proper condition of cut-over area, and so forth. The material may be paid for according to estimate or by scale after cutting. The proceeds from sales are sent directly to Government banks, except in small sales of less than $150, when a forest officer may receive the money.

The felling is accomplished by means of saw and axe. The saw is broad and simple toothed with a handle in one end, and is so short as to necessitate

ODATE GOVERNMENT SAWMILL

THE OUTPUT OF THIS MILL IS ABOUT 25,000 FEET OF MANUFACTURED TIMBER A DAY. IT IS SITUATED IN NORTHERN JAPAN

METHOD OF HAULING LOGS

THIS IS A WELL GRADED SKIDROAD ON THE ODATE MINOR FOREST, JAPAN AND THE THREE MEN WERE ABLE TO HUSTLE THE TWO BIG LOGS DOWN THE GRADE AT A LIVELY PACE

circling around the larger trees to get them down. The axe used for notching, limbing and felling is narrow and wedge shaped, while another broad axe is used for barking. To assist in rolling the logs the chopper uses a hook, somewhat similar to one side of a miner's pick.

Logs are usually cut 12 feet long, and the larger ones are often hewn square in the woods to make them lighter, and because they are most easily sold that as possible, and 2¼ to 3¼ inches wide by 8 inches long. They are bundled in units of 400 shakes, and sold at 15 cents per unit. From a log 12 feet long and 1 foot square is made 10 to 12 units, which represent a gross value of $1.50. When labor is deducted at the rate of 5 cents per unit, it leaves $1.00 for the log, which is 40 cents more than the log would have sold for in the square. Sugi splits equally as well as hiba, and

STACKING PULP LOGS
BY MEANS OF TWO ROPES PULLED BY A SCORE OF MEN THESE LOGS ARE HAULED OUT OF THE RIVER AND STACKED IN LARGE PILES

way. This method is practiced on the Utchimappu, and the chips are bundled and sold for 1 cent per bundle in the woods or 4 cents in Aomori. The weight of the bundle is supposed to be one half the amount one man can carry. The trees are cut to 3 inches in the top, and the remainder of the tree is utilized for fuel or charcoal when close to settlements.

The bark of the sugi and hiba is used for tannin, and brings a price of 6 and 4 cents respectively per 6 square feet delivered at Aomori. Shakemaking is a common industry at Utchimappu, where the hiba is used for this purpose. The shakes are all split by hand as thin is also used to a great extent in shakemaking on other forests. A visit to a Japanese match factory and a pulp mill was very interesting.

Charcoal burning is a highly developed art in Japan and this is only natural because of the much greater use per capita of this product than in any other country.

In addition to the Japanese laborer, who is very efficient when trained, is used the Aino for common woodswork in the north. The Ainos possessed the islands prior to the Japanese invasion; but they have since gradually been driven back. They are naturally large and powerful, with a prolific growth of

hair, and are the very antithesis of the small Japanese inhabitants.

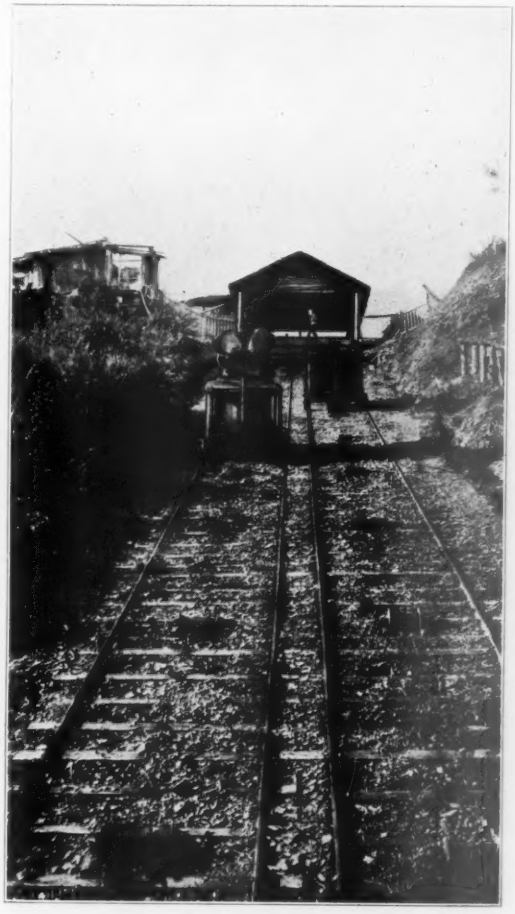
These people are the lineal descendents of the inhabitants of the wild forest regions, where they depended entirely on the capture of game for a livelihood. It is said of them that one of their favorite pastimes is to corner a bear and kill him by brute strength. The wages of a chopper vary from 25 to 50 cents per day, according to his ability, and a man with one horse gets from 60 to 75 cents per day.

A technically trained forester commences with less than $10 per month and a Major Forest Officer receives a salary of $1,000 to $1,500 per annum.

The total force on the Utchimappu Minor Forest consists of thirteen men, and the monthly pay roll amounts to $115.

Transportation is one of the most interesting phases of the work in the woods of Japan, a fact due partly to the almost total lack of horses. Man bears the burden of the beast in this country, and most of the hauling is accomplished through human strength. Well graded roads are ordinarily laid out through the forest to be logged, and are provided with skids or crossties a few feet apart. The logs are loaded on to small wooden sleds, which are made mobile by two coolies pulling in front and one pushing from behind. The loads slip along comparatively easily on the skidroad, and the logs are transported in this manner to the stream, railroads or sawmill as the case may be. The sled is not so heavy but that it can be picked up and carried back into the woods by one man.

Baby railroads are constructed where long hauls have to be made, and where there is sufficient timber to justify the investment. One is being operated at Utchimappu as well as one of considerable length at Odate. The roadbed is laid out on an even downhill grade so as to allow the cars to run entirely by gravity. The cars are small, but are able to carry surprisingly large loads. They are easily pushed by one coolie on account of the fine grading. The railroad is built single track, with no sidings, and the car is light enough for one man to lift it off the track when it is met by a loaded car coming down. Efficient brakes are provided each car, which is very essential in order to avoid accidents.



A WATER BALANCE

THE LOGS ARE RAISED UP THIS STEEP INCLINE BY FILLING THE DUMMY CAR AT THE TOP WITH WATER UNTIL IT OUTWEIGHS THE CAR CARRYING THE LOGS

River driving is carried on wherever possible, and the stream improvements, dams, and so forth are constructed in much the same way as in any other country. Watching the drive one day, the forest officer hailed an expert driver and told him to give us a little exhibition. The man rode down the stream nicely on one log, and I snapped his picture while he was rolling it. He took stage fright, however, fell in the water, and had a hard time making it for shore.

A Logging Railroad
THESE CARS ON THE ODATE GOVERNMENT FOREST ARE RUN MAINLY BY GRAVITY

A water balance was erected at Odate, where the logs had to be elevated about 100 feet from the river to the sawmill on the bank. This was accomplished by means of a short double track railroad on a steep incline provided with two cars fastened together so that one would be at the top, when the other was at the river. The cars were made water-wagon fashion, and while the one car was being loaded with logs at the river, the upper car was filled with water. When full it would outweigh the logs, and down it would go to be emptied and loaded with logs again.

An aerial tram was also built at this point for transportation of logs and ore in cooperation with the Kosaki Mining Company.

There are at the present time about eleven sawmills operated by the Government, of which two were visited. They are primitive in construction with a conglomeration of foreign made machinery. At one mill were found German, English, and American made parts in addition to machinery made in Japan. The mills are low powered and operating mainly gangsaws and circulars, using bandsaws to a small extent for re-saws. The average output was approximately 25 M. per day. Three men were necessary to roll the log onto the carriage, where it retained its place by its own weight. Above the circular saws could be seen punctured tin cans filled with water, which was steadily dripping down on the saw to keep it cool. The sawdust was swept through a hole in the floor into a basement,

AN EXPERT JAPANESE DRIVER

THESE MEN BECOME REMARKABLY CLEVER IN RIDING THE LOGS AND DELIGHT TO COMPETE WITH EACH OTHER IN ACROBATIC STUNTS ON THE LOGS, PARTICULARLY IN THE SWIFT CURRENTS

A Log Drive

LOGS CUT ON THE UTCHIMAPPU MINOR FOREST IN JAPAN AND PILED ON THE BANKS OF THE RIVER READY TO BE STARTED DOWN STREAM. THE CURRENT IS SWIFT AND THERE ARE MANY SHALLOWS NECESSITATING CAREFUL DRIVING IN ORDER TO PREVENT JAMS

where women collected it in baskets and carried it off on their backs.

Planting has been carried on by the Japanese for probably a much greater period than 400 years, and it is this work that gives Japan credit for having practiced forestry before any other nation. As a matter of fact, however, the forests of Japan have been under real forest management less than thirty years.

Large and small nurseries are scattered throughout the islands, and are kept in excellent shape. In the nurseries visited sugi and hiba were the principal species. Sugi is the most important of the two and requires no shading. Hiba is shaded the first spring with straw screens or mats. The stock is grown 3 to 4 years old and transplanted once or twice. The usual spacing in the field is 4 by 6 feet, or 1,800 plants per acre. One man plants from 150 to 200 per day, and at a daily wage of 25 cents this work costs $2.70 per acre. The cost of the plants amounts to 75 cents per 1,000, or $1.35 per acre, giving a total cost of $4.05 per acre for planting work.

Utchimappu Minor Forest alone plants annually 600,000 sugi and 400,000 hiba on nonrestocking cut-over land and on treeless areas.

Japan has three higher schools of forestry. One is connected with the Imperial University near Tokyo, one is at Morioka, and one at Sapporo, Hokkaido. The Imperial University offers a three years graduate course leading to a degree corresponding to "Bachelor of Forestry."

The school at Sapporo enrolls thirty students every year, of which about one-half enter the Government Forest Service of Hokkaido.

The forest experiment station at Moguro in the neighborhood of Tokyo, comprises 10 acres and is 20 years old. It offers an excellent exhibition of native and foreign species, model nursery, laboratory, and collections.

The Botanical Garden in Tokyo is also intensely interesting, and has odd specimens of Japanese and foreign species.

The Meeting at San Francisco

Great interest is manifested in the meeting of the American Forestry Association at the Panama-Pacific Exposition at San Francisco, Wednesday, October 20, in conjunction with the Western Forestry and Conservation Association.

Many members who have decided to visit the Exposition have timed their trip to be able to attend the meeting. The program for the day is now being arranged and will shortly be announced. It will deal chiefly with western forestry problems, and with the value of the Association and its work.

Members who wish to do so can arrange to join a party which will spend October 22 and 23 in the Redwood Lumber Camps. In this party will be a number of forest conservationists, lumbermen and loggers.

There is a wide variety of trees in California and many of them are along the general routes of tourist travel and may readily be seen. American Forestry will have an article in the July issue describing these and telling how best to reach them.

AMERICAN ACADEMY OF ARBORISTS

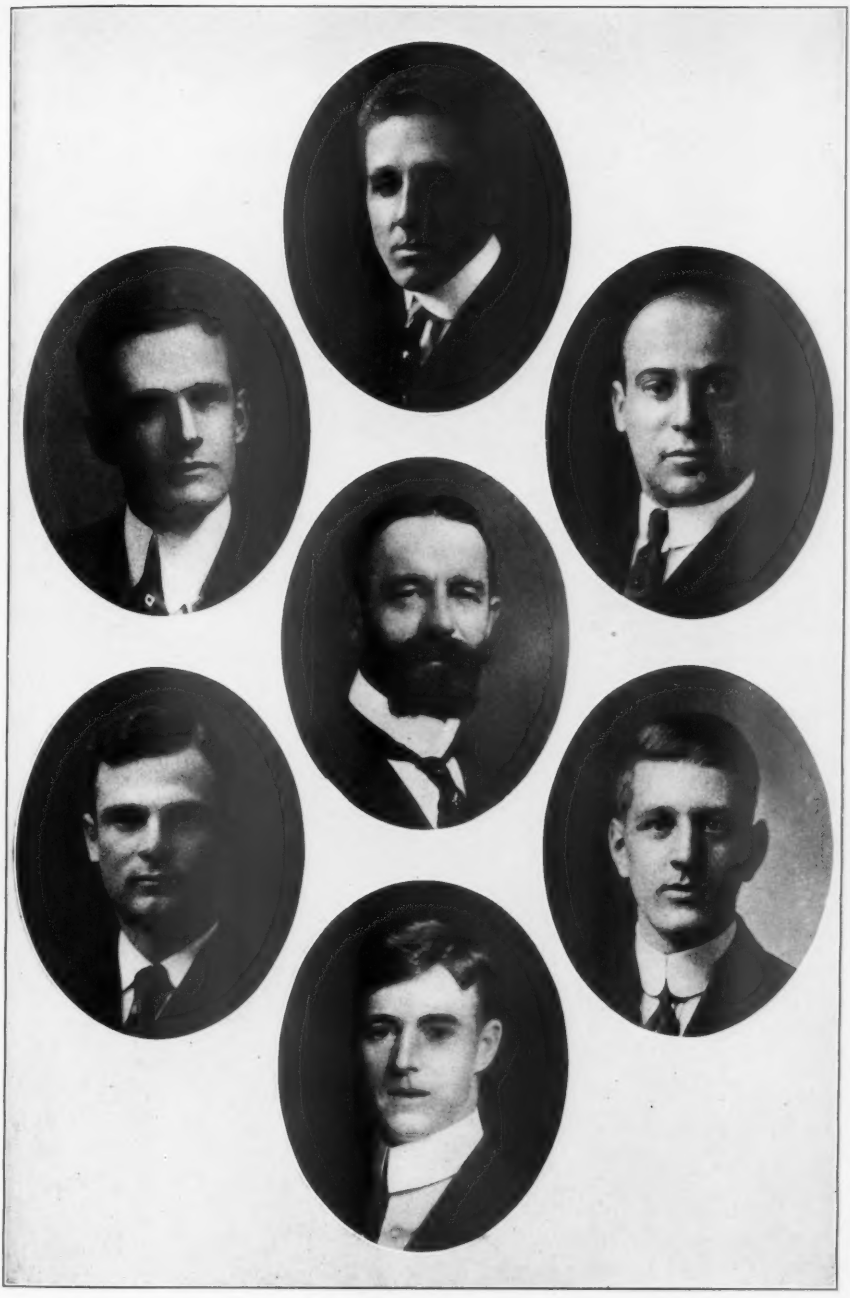
RECOGNIZING the need of an association for the future development of their profession a number of City Foresters, men interested in landscape forestry and others qualified for membership, have organized the American Academy of Arborists. Arborist is the term now being generally accepted to designate men proficient in city and landscape forestry. The Association will be conducted on a highly technical and professional basis, its aim being expressed in the constitution as being "to place and maintain the practical arboriculture and landscape forestry of the country on the highest professional basis." There are to be two classes of members. Fellows, who must be over 25 years of age, who are graduates from schools specializing in Arboriculture or the arts and sciences closely connected with Arboriculture, and Honorary Members who shall be persons of broadly acknowledged eminence in Arboriculture or landscape forestry.

The charter members of the organization are Herman W. Merkel, Chief Forester of the New York Zoological Park; William W. Colton, Forest Commissioner of West Newton, Mass.; Prof. J. W. Toumey, Director of the Yale Forest School; J. J. Levison arboriculturist of the Brooklyn, New York Park Department; Harold J. Neal, City Forester of Worcester, Mass.; R. B. Maxwell, City Forester, of Baltimore, Md.; George A. Cromie, City Forester of New Haven, Conn.; James H. Walker, City Forester, Newark, N. J.; H. B. Filer, City Forester, Buffalo, N. Y.; and A. T. Hastings, City Forester, Jersey City, N. J.

From these charter members the officers were selected. They are: President, Hermann W. Merkel; Secretary, J. J. Levison; Vice-Presidents, William W. Colton and R. B. Maxwell; Directors, James H. Walker, George A. Cromie and Harold J. Neal.

JOHN BIRKINBINE DEAD

THE many friends of forestry in Pennsylvania, and elsewhere, lost an ardent advocate of forest conservation, in the death, on May 14, of John Birkinbine of Philadelphia. Mr. Birkinbine was President of the Pennsylvania Forestry Association, an office he had held continuously from 1893, and to which he devoted much of his time and energy. He worked enthusiastically and steadily in the cause for the last thirty years and was active in the founding of the Pennsylvania Forestry Association in 1886, and in making it the successful organization which it has been since its inception. He did not confine his efforts to further the cause of forest conservation to Pennsylvania, for he was always eager to aid in extending the agitation for the better use and protection of forest lands in any part of the country. His death removes from active participation in the cause of forestry a man who had achieved a place as one of the leaders in the movement. Besides his forestry interests Mr. Birkinbine had acquired an international reputation as a water power expert.



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SHADE TREES AND SHRUBS

A DEPARTMENT FOR THE ADVICE AND INSTRUCTION OF MEMBERS OF THE AMERICAN FORESTRY ASSOCIATION

EDITED BY J. J. LEVISON, B. A., M. F.

Arboriculturist Brooklyn Park Department, Author of "Studies of Trees," and Lecturer on Ornamental and Shade Trees, Yale University Forest School

It is the aim of the American Forestry Association, in conducting this department in each issue of AMERICAN FORESTRY, to provide its members with expert advice upon the selection, care and cultivation of ornamental and shade trees and shrubs, for park, garden, lawn and street uses. Members are invited to make inquiries of this department, write their experiences and to ask for any such suggestions or advice as they may desire.—EDITOR.

PROPER CUTTING OF A LIMB

THE LIMB SHOULD BE CUT CLOSE TO THE TRUNK OF THE TREE AS SHOWN IN THIS PHOTOGRAPH

FOR many years past, the landscape architect has championed his profession by establishing beautiful parks and country estates. The forester, too, has demonstrated the value of his calling by pointing out ruthless methods of cutting and showing how to protect and utilize the forest to the highest point of efficiency. Not so with the arborist. His work came in demand very recently; not until the great masterpieces of Olmsted, Vaux, Downing and many others began to show signs of decay and not until we saw the premature death of the stately elms of New England and of the thousands of other beautiful specimen trees upon which Nature itself —the greatest artist of all— has bestowed special favor. To save these trees and care for all others required highly specialized attention. The professional arborist had to be called in and now his position is as fixed as that of his coworkers. He has come to stay and is required to maintain what the others establish.

Ten years ago the arborist was unknown and not appreciated. Today he is sought by everyone who owns a

tree or a bush. In fact, his services have become so popular that a number of men have sprung up who presume to be expert arboriculturists and who really have no title to that trust. These men, unwittingly or otherwise, often do work of absolutely no importance to the vigor of the tree and neglect the fundamentals.

One aim of this new department will be to help these men in the business in which they are expected to be expert and to enlighten the employers of such men as to what is salient and what is not. Aside from these men, however, we have in this country many commercial firms and individuals who thoroughly understand their business and who can be absolutely relied upon. We have many city foresters, arboriculturists, tree wardens and superintendents of trees who are eminent in their profession. With these we expect to cooperate and by interchange of opinions mutually help each other. It was chiefly due to the honest work of these professional men that the interest in arboriculture has assumed such vast proportions. The cooperation of the landscape architects, foresters, superintendents of parks and private estates and gardeners was almost equally important because they all recognize that it is to their interest as well as to the interest of the owners to have some one work with them who by training and experience is able to give special attention to the numerous details of tree culture. Outside factors also helped to bring this about. Some of these are the rapid growth of cities and the consequent desire on the part of their inhabitants to maintain country homes; the enhanced interest in social welfare and park development and the increased number of insect and fungous pests.

The arborist's sphere is primarily to care for and to plant trees and shrubs in parks, woodlands and on streets. But the word care is a big word and includes a great many related subjects, each of which is almost a study in itself. It includes a knowledge of the habits of the injurious insect and fungous pests and methods of combating them; it includes methods of fertilizing, repair protection from unfavorable extraneous agencies, such as gas and sewerage leaks, compact soils, overhead wires, root injury, etc. The word planting also takes in a bigger field than the mere planting of trees. The arborist very often has to plant shrubs, vines and wild flowers. He has to know whether certain plants will do well in certain locations and he has to know just how

DAMAGED BY HORSES

RESULT OF NEGLECT IN PROPERLY CARING FOR A TREE WHICH HAS BEEN INJURED BY HORSES BITING IT

to nourish the plants immediately after planting.

All this gives one the impression that the field is clearly defined and the knowledge and methods thoroughly exploited. This is not so. The field is full of new problems, new methods present themselves daily and the literature on the subject is only in its infancy. Many of these problems are details only of special technical interest while others, of vast importance, are of more general interest. Such questions, as what particular brand of spraying material to use and how and when to combat some particular insect, are examples of the former, while such considerations as municipal control of shade trees, proper handling of woodlands in parks and on country estates,

SPRAYING WITH A BARREL PUMP

THIS IS A HANDY AND SERVICEABLE METHOD MUCH USED IN BOTH PUBLIC AND PRIVATE WORK, ALTHOUGH FOR CITY SHADE TREE SPRAYING THE PUMPING APPARATUS ON A WAGON IS THE BETTER AND MORE ECONOMICAL

WORK OF THE HICKORY BARK BORER

SECTIONS CUT FROM DAMAGED TREES, SHOWING THE HOLES OUTSIDE THE BARK MADE BY THE BORER AND THE GALLERIES INSIDE THE BARK

establishment of municipal nurseries, city forests and state parks and the proper ground cover for slopes and woodlands are questions of the latter class.

To the one interested in the care of trees there may thus be offered hundreds of suggestions of innumerable practical value. The men at present engaged in this work are still learning and exchange of experiences and discussions would therefore be of value to all. This is just what this department aims at. It will need the cooperation of all interested, welcoming both your questions as well as your findings and it in turn will aim to make its information as authoritative as it possibly can make it.

ADVICE FOR THE MONTH OF JUNE

Cultivate and water all young plants. It is quite essential that young plants, especially those recently set out should be watered and weeded during the summer months. No fixed amount of water can be prescribed; that will vary with the size and habits of the plant as well as with the local soil and climatic conditions. It is well to dig down occasionally and examine the moisture conditions of the soil around the roots, this will avoid the danger of overwatering.

Destroy the nests of the forest tent caterpillars so common at this time on wild cherries, mulberries, willows and other trees. Apply a burning rag or torch to the web or else squirt a little kerosene into the web. Where the webs can be readily reached, the latter is preferable because it prevents burning of the infested branch.

Spray for leaf-eating insects. The necessary apparatus and arsenate of lead, the standard material, should be held in readiness and the spraying should be done after due consideration of the habits of the particular insect in question. Information on the habits of any particular insect pest and definite instructions as to time and methods of spraying can be obtained from the local State Agricultural Experiment Station or from the United States Department of Agriculture.

Most leaf-eating insects commence defoliation at the end of May. The elm-leaf beetle, in the vicinity of New York City, starts feeding on about the fifteenth of May. In combating leaf-eating insects use arsenate of lead, of a recognized brand, at the rate of 1 pound to 10 gallons of water. Make the application to the under side of the leaves as soon as feeding begins or a few days before if that can be anticipated.

Hickory trees infested with the hickory bark borer should be removed and destroyed at once because the beetles emerge from the infested trees in early June and soon after proceed to other neighboring hickory trees where they deposit their eggs in the outer sapwood. In the vicinity of New York City, including all of Long Island, parts of New Jersey and Westchester County, nearly all the hickories are badly infested with this pest.

The presence of the insect can be detected by the small holes in the bark of the trees and the fine sawdust which is ejected from these holes, when the insects are active. It is important to emphasize the advisability of detecting the fine sawdust because that is the best indication of the actual operations of the hickory bark borer. These holes, however, will not be noticeable until the insect has completed its transformation. In summer, the infested trees show wilted leaves and many dead twigs. Holes in the base of the petioles of these leaves are also signs of the working of the insect. Since the insect works underneath the bark, it is inaccessible for treatment and all infested trees should be cut down and burned, or the bark removed and the insects destroyed. This should be done before the beetles emerge from the tree in June.

Spray for certain sucking insects. Such species of sucking insects as the oyster shell scale hatch their eggs at this time and can be most successfully combated when the young commence to crawl. There are several oil emulsions in the market suitable against these insects but their use is dangerous without specific instructions as to strength, time of application and the kind of tree to be applied on.

In almost every group of trees one will find a few that show at this season, a number of branches which have died off during the winter. These dead branches can be removed now as well as later. In removing these branches the cuts should be made close and the resulting wounds should be covered with coal tar.

[Requests for advice or information from this department should be addressed to Editor, AMERICAN FORESTRY, Washington, D. C. They will be given prompt attention.]

Change in Address.

Members of the American Forestry Association are requested to send notification of any change in address so that the AMERICAN FORESTRY MAGAZINE and other mail will not be delayed in reaching them.

Such notices are desired before the 25th of each month so that the address may be changed for the monthly mailing of the magazine.

HICKORIES, ELMS AND ASH TREES

By WARREN H. MILLER, M. F.

THIS group constitute a striking set of individuals which, next after the oaks, maples and birches are most frequently met with in the average hardwood forest. Our hickory is a most American tree, as typical of our Republic (before the present epoch of imperialism set in) as the wild turkey among our birds or the bison among our animals. They have nothing like the hickory in Europe; no tree that combines so many fine lumber qualities as well as producing a nut finer in flavor than any imported variety whatsoever.

It is one of those distinctively American things, unique in its excellence not to be matched elsewhere—a leaf of hickory ought to find its place on our national escutcheon! Like the turkey and the bison, the hickory has been little appreciated by us as a nation, and it has been allowed to go almost to the vanishing point. The hickory bark borer destroys hundreds of thousands of wild trees every year, now that the birds are so scarce; no young trees are coming up to take the place of those that we have; and no attempt is being made to raise hickories on a large scale, either in orchard or in forest. On the farm the hickory is appreciated to the point of leaving a fine one standing when clearing a field, partly as a shade tree for cows, partly because a good one can be depended upon for about two bushels of nuts every seed year.

The wood commands about twice the price of white pine, $30 at the mill per M., and we use 350 million feet of it a year, a rate of cutting that plays havoc with the very existence of the tree in wild forests. The estate owner has a big field ahead of him in the study and growing of this tree (the shagbark being the one understood by the general term "hickory"), yet the only one actually orcharded on a large scale is the southern hickory or pecan. As the natural range of this nut is up the Mississippi Valley as far north as Wisconsin, there is no reason why it cannot be grown anywhere throughout our area, in fact all the nurseries offer "hardy" pecans for northern growing, which are doubtless from wild stock growing in the northern part of its range. But there is no reason why shagbark hickory can not be grown, either in forest or in orchard, the former for lumber and nut crops, the latter for nuts only—either way it would be a paying proposition for one whose tastes lie in the realm of horticulture. But I take it that these articles interest chiefly the man who does not fancy the cares and labors of orcharding, but who does love to have plenty of wood about him and is not averse to bettering the quality of and beautifying within reasonable expense limits his own wild forest. For him the shagbark will be a tree to plant and encourage wherever a moist loamy bottom of granite, limestone or clay base exists. It does not do well in sand base soils. Nurseries seldom offer young hickories, as they are exceedingly difficult to transplant, and wild stock, gathered, no matter how young, is nearly certain to die. The way to set a tree in a given locality, then, is to plant one or two sound healthy nuts and save the vigorous seedling. Also, wherever nature has already started a young hickory, to clear away the overgrowth and give it all the encouragement possible.

We have a number of species of hickories, but four of them will be enough to know and identify. The shagbark is known at once by its long, hard, whitish gray bark scales, warping off at both top and bottom from the trunk. Young specimens are not so easy to be sure of, but look for a large five-leaved leaf with the center leaflet very large, two nearly as large on each side of it, and two little ones behind that, and your identification is reasonably certain. Occasionally they have a

seven leaflet leaf, but as a rule this number belongs to its cousin the mockernut. The shagbark is an exceedingly imposing and stately tree in any forest and one can hardly have too many of them. They cannot be grown in pure stand, however, for the drain they make on the vitality of the soil is very great, almost as great as with the ash tree.

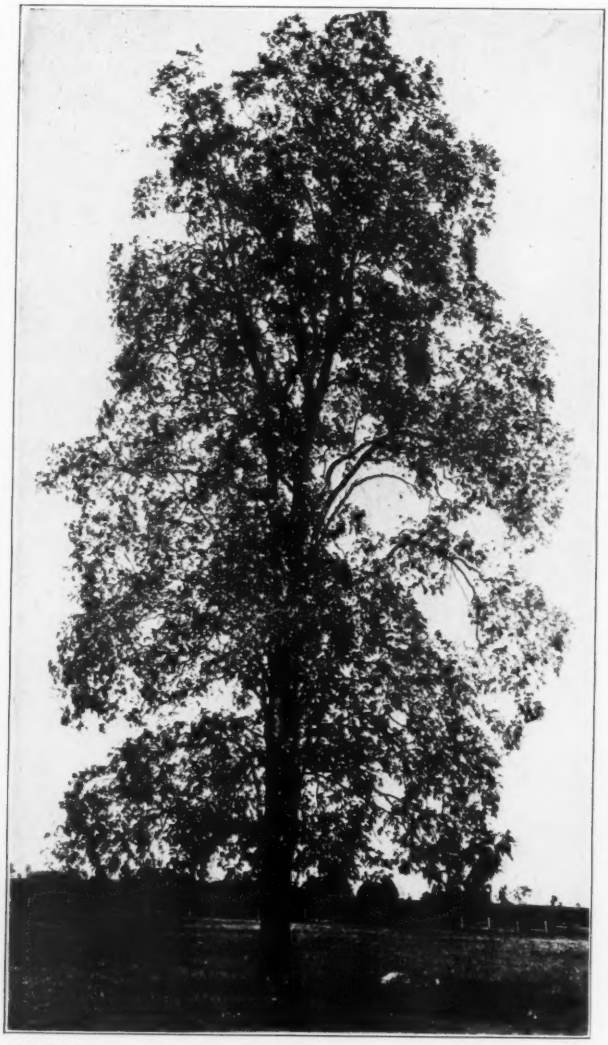


Photo by Romeyn B. Hough, Lowville, N. Y. Author of "Trees of America."

THE SHAGBARK HICKORY

THE NATIONAL TREE OF AMERICA. NOTE THE CHARACTERISTIC, TALL OBLONG CROWN EVEN IN FIELD GROWTH

In the autumn the shagbark leaf goes right to a russet brown and is soon down, so that it cannot be depended upon much in the autumn color scheme. The wood, like that of all the hickories, is tough, strong, springy and heavy; salable at high prices for all sorts of tool handles and carriage work; not durable in the ground. The nuts bring $2 a bushel in the open market, so that the biannual yield from each tree runs over $12.

Higher up on the ridges and uplands you will find that smooth-barked cousin of the shagbark, the mockernut hickory, so named by the named by the country boy because of its thick shelled nut with the small sweet kernel, which looks so very like a shagbark nut, but which, after several stones have been smashed in breaking it, yields only a tiny reward for the great labors involved. This tree will grow in sand base soils as well as in all the others, and is blessed with a glorious, pale yellow leaf coloration in autumn, so that, when prospecting for nuts in the fall you come upon one of these shafts of flaming yellow looming up through the trees you may be sure that it is *not* a shagbark—and get out your sledge-hammer forthwith!

The wood is equally as valuable as the shagbark, but more pliant. Woodsmen use it to make rope of,

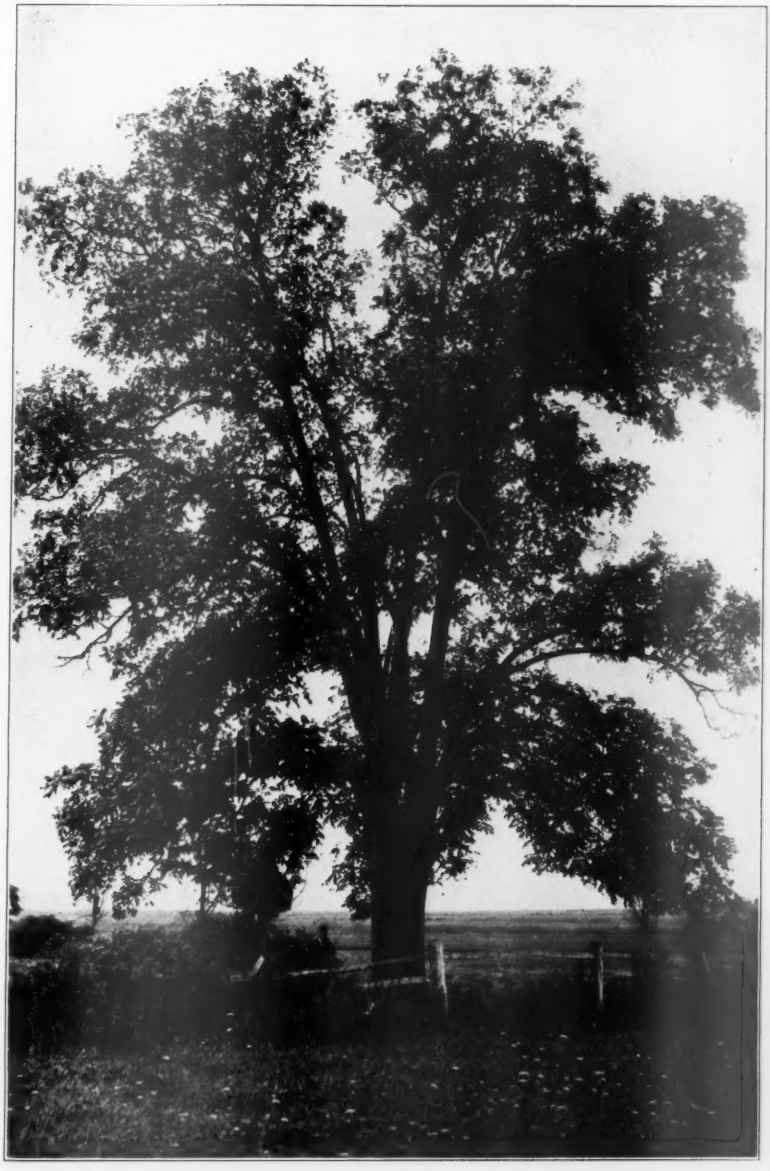


Photo by **Romeyn** *B. Hough, Lowville, N. Y. Author of "Trees of America."*

THE MOCKERNUT HICKORY

THIS TREE IS BROADER AND DARKER BARKED THAN THE SHAGBARK, AND IS ALSO LACKING IN THE SCALY BARK. WITHES AND BASKETS ARE MADE OF THE TOUGH FLEXIBLE BARK AND SHOOTS

usually by peeling off the bark and plaiting it into a rope, kept smooth and pliant by rubbing with deer fat. To show what can be done with it the writer once took a small sapling of the mockernut hickory, peeled off the bark like stripping a glove from the finger, split three strips of it a yard long and one-eighth inch wide, tied them in a double knot at one end and plaited the three into a braided rope; and in five minutes' work with the hands alone had a rope that three men could not break. Not only that, but he then tied this rope to a bow made of the sapling itself, at both ends with a clove hitch knot, put it around a cedar fire drill and made two fires with it before the rope wore out! Up to the time that I tried that experiment I was very skeptical that any thong could be made of vegetable fibre strong enough yet flexible enough to withstand the terrific wear and tear of fire making with the rubbing stick; but, given a sharp flint stone, a dead cedar or balsam and a young mockernut hickory, I will make you a fire any time with my bare hands in half an hour's time, and I hold a medal of honor for that feat!

Growing in still poorer soils if need be, but on rocky ledges and hillsides by preference, is the pignut hickory, a rather small member of the family, but very handsome, especially when it paints blobs of sheer orange on your hillside in autumn. The nut is very variable, some specimens giving a small thin-shelled bitter nut and other ones with thick shells, occasionally sweet. It is a sort of degenerate shagbark, with the same five to seven leaflets but smaller and pale underneath; bark, gray but close-adhering. This tree is well worth saving, even though its nuts are not edible, as it is always handsome in appearance, even stately when gdowing in generous soils (reaches 120 feet high and three feet diameter in the Ohio basin) and its lumber commands high prices for wagon and tool work, so that you are blessed if your hillside has a fair sprinkling of them. Planted from seed, not to be transplanted, like all the other hickories.

The last of the group is the swamp hickory or bitternut. It will get a foothold of its own accord on the edge of your pond or lake, and, as it there gets plenty of sun, will have a lot of long branches and therefore be worthless as lumber. However, both it and the pignut yield grand firelogs for the open fire, in the library of a winter's night, so that any surplus of them growing in your swampy spots should be encouraged for future stores in the wood pile. It has eleven leaflets, small and narrow; and a small, bitter nut, but at that, the tree affords a refuge and a granary for your red squirrels and chickarees. As a landscape feature on a pond border it makes a most graceful and attractive hickory, with orange leaves in autumn. It grows readily from seed and can be transplanted, with care, taking up while dormant and following the roots out far enough to get a reasonable amount of feeders. Transplant in the spring well before the sap starts up the tree.

All the hickories have two kinds of flowers, the sterile green catkins, which furnish the pollen, and the fertile flowrets, which later develop into nuts. The tree is thus able to set its own fruit, and the seed years are from two to three years apart.

Of the elm group but two are at all common, the white and rock elms. The white elm occurs over our whole range, but has its best growth in the north, and never does well in close forest as the heavier-leaved trees soon crowd it down and kill it. But, favored with sun and clearness, it makes a stately growth, the joy of the landscape architect, with its characteristic sweep and droop of the many branches. The wood is of high value for tough usages like wagon wheel hubs, pulleys, etc., but is an indifferent dangerous firewood as it sparks almost as badly as hemlock. It contributes nothing to the autumn coloration for its leaves go quickly to brown and are soon down, but all summer long it more than compensates. Also the dead leaves soon perish, making it a good lawn tree. Prefers moist granite or limestone soils, but will succeed in clays and to a certain extent in

THE WHITE ELM

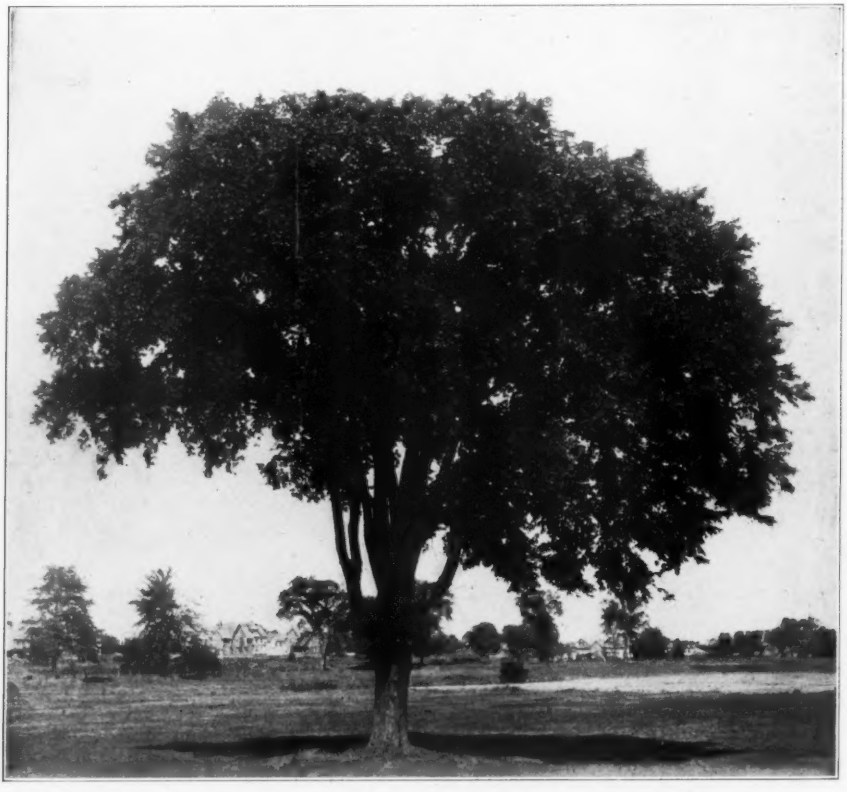
ONE OF THE GREATEST FAVORITES AMONG AMERICAN TREES. NOTE THE WHITE OAK GROWING BENEATH IT, AND PROBABLY OF THE SAME AGE

sand bases. Usually crooked and spindly in forest, so see that it has clearance on a hillside or other location where there is plenty of sunlight.

The other elm, the rock elm, is very scarce in the east and fast growing so in the west, almost as rare in fact as the nearly extinct slippery elm, once fairly common all over our area. About ten years ago, when the writer was engineer for a large western car works, almost the first work I undertook for them was the design of an all-steel hand car because the end of the rock elm was already in plain sight! This company then had all the available rock elm located and a lien on it for future use, but at that, they were preparing

for the last of it by replacing their rock elm car sills and walking beam frames with pressed steel. For combined toughness and strength, no other wood begins to approach the rock elm, even longleaf yellow pine being a poor second, while the oaks were not to be thought of. Anyone who has worked this wood with carpenter's tools will appreciate this, and as it is not to be replaced with any material except pressed steel, if I were growing elm at all as a forest proposition, the rock elm would be my choice. The characteristic feature of this valuable tree is the corky ridge formation on its twigs. It is a small and more compact tree than the white elm, easily propagated from seed in nursery beds, and readily transplanted, as are all the elms, but it is not offered by nurserymen who usually confine themselves to the more ornamental white and weeping elms, both costing about one dollar for 8 to 10 foot specimens. They all require rich moist soil, the red or slippery elm never straying far from a river bottom, and the rock elm taking the drier soils. The leaves of all of them are much alike, with characteristic parallel leaf veins, the red and rock elms having longer and thinner leaves than the white. The last two are much less vulnerable to insect attack, foreign insects in particular being a veritable scourge to the white elm.

Perhaps the most interesting of all the trees in this group are the ash trees. That poet who wrote the line "The warlike ash, reeking with human



ANOTHER ELM

NOTE THE GREAT SPREAD OF THE BRANCHES WHICH MAKES IT PARTICULARLY DESIRABLE AS A SHADE TREE

ELM TYPE COMMON IN OHIO

THESE WHITE ELMS ARE PROLIFIC IN CENTRAL OHIO AND ARE AS POPULAR THERE AS IN OTHER SECTIONS OF THE UNITED STATES

blood" hit the keynote of ash characteristics, for the tree has been most intimately our strength since the earliest stone ages. In fact, the Edda, the Sacred Tree, whose crown upheld the heavens, and under whose roots burnt the hells, of the most ancient mythology of the human race, was the ash, and, with its blood-red flowrets, like drops of human blood along the twigs, the tree well bears out the poet's similie. Since the world began man has made his bows and his spear shafts, and has split out his arrows from the ash, and, though it belongs to the same family as the olive, the symbol of peace, we as a race would cheerfully give all the olives in the world for one stark, heathen ash tree! Aside from its warlike qualities the ash is the queen of the forest for beauty, and the wolf of the forest for soil consumption. When an ash tree is through it takes a whole revolution of beech to restore the exhausted soil, and, to insure that no other tree shall share the soil with it, the rain drippings from its leaves kill every other sapling that tries to make a start. Even its own young cannot live under it, and, to insure that they get a fair start, Nature provides a seed like a small winged javelin that will fly to a considerable distance and then strikes deep into the soil, point first. And, to insure high winds to carry them far, these samaras have so tough a stem as to hang on until late in the winter when only an unusual gale can tear them loose.

With its seven to nine leaflets on the leaf stalk, the ash is like to be mistaken for a hickory, but an inspection of the fruit or flowers will decide at once. The deep red flowrets in small bunches, sessile on the twigs, are nothing like anything on a hickory tree and, later, the bunches of long, winged samara, like maple keys, in no way resemble a hickory nut! Both American white ash and European *F. Excelsior* are easily obtained from nurseries, at prices ranging from 75 cents to $2 for specimens from 10 feet to 2½ inches diameter and 25 feet high; or they can be propagated from seed by collecting from the trees in the fall, putting in heaps in compost piles (which rids them of their wings) and planting in nursery beds in the spring. Readily transplanted to forest sites in the second year provided that the tap root is cut and the seedling transplanted in the autumn of the first year.

For soil preference the white ash likes a rich moist loam, any base except sand, anywhere not too dry, and it needs lots of sun. The black ash wants a more swampy location, and both of them give a handsome crown of leaves with many branches, the leaves turning to copper and purple-green in the autumn. In the forest the ash has a tall columnar trunk with no side branches until it reaches the crown of the forest, when it branches out with a round heavy crown. In Europe the thrifty French grow it in oak forests in the proportion of about one ash to four oaks, and also use it as shade over coppice growth. I have seen whole forests of it forming a light shade over young coppice shooting up from old oak stumps, the ash trees being spaced about forty feet. Over there its principal enemy is the cantharides or Spanish fly; indeed, in the south of France it is grown to *attract* these insects, which are then collected in great numbers for medicinal purposes. Our own white ash is immune from Spanish fly attacks, so it also is now being largely introduced in the clay base forests of the Seine basin, in both oak standard forests and oak coppice.

We have four principal species of ash trees, the white, black, green and blue. The wood of the first is strong, light, elastic and, beyond a certain point, brittle. The name ash comes down to us unchanged from the Saxon word *aesc,* a pike, and the latin *fraxinus* from its sudden snap off short when over strained. The white ash is known from the black by its bark, which is ridgy with the striations crossing at a long slant, giving innumerable lozenges of bark, and by the short stems of its leaflets, for the black ash has sessile leaflets and a soft gray bark without lozenges. The wood of the latter is more pliant and darker in color, but it, too, snaps off short like a biscuit when the limit of its endurance is reached. Often called the "hoop" ash because in the backwoods, hoops and baskets are

Photo by Romeyn B. Hough, Lowville, N. Y. Author of "Trees of America."

THE WHITE ASH

THE WHITE ASH, THE EDDA OR SACRED TREE OF THE WHITE RACE, WHOSE CROWN UPHOLDS THE HEAVENS
THE HISTORY OF THE WORLD COULD BE WRITTEN AROUND THIS TREE

Photo by Romeyn B. Hough, Lowville, N. Y. Author of "Trees of America"

THE BLACK ASH

THE SNOWSHOE AND HOOP ASH OF THE REDMEN. THE WOOD IS EXCEEDINGLY FLEXIBLE AND STRONG, ITS SAP RINGS ARE SO FORMED THAT SOAKING AND POUNDING SEPARATES THEM INTO FLAT STRIPS

made from it by sawing off a section of green branch, free from knots, beating it soundly to separate out the annual rings and then splitting the stick as wide as the hoops are wanted, say two inches. The annual rings then separate by hand and give as many strips as there are annual rings in the billet.

Of the other two ashes, the red (or green), both varieties of the same species, is a small and infrequent tree, hard to tell from the white ash, preferring stream sides and low locations in company with red maples and gums. Its samaras, grown on a little fishpole of a stem, distinguish it from the white

ash, and, like the others, it makes a very handsome shade and ornamental tree. A clump of four of them that I know personally are growing in Riverside Park up a hundred feet above the Hudson in New York City and are doing very well, though the location is drier htan Nature would select.

The blue ash, *F. Quadrangulata,* is rare east of the Ohio basin, but easily grown here. A very pretty small tree, with bluish bark from which the Indians used to make their blue dye by boiling the inner bark. Its twigs are mint shaped, that is, four-sided, whence its specific name, and it is the only one of the ashes which does not split easily. Because of its toughness lumbermen use it for raft and car side poles. On the forest estate it would be more an interesting curiosity than a subject for planting.

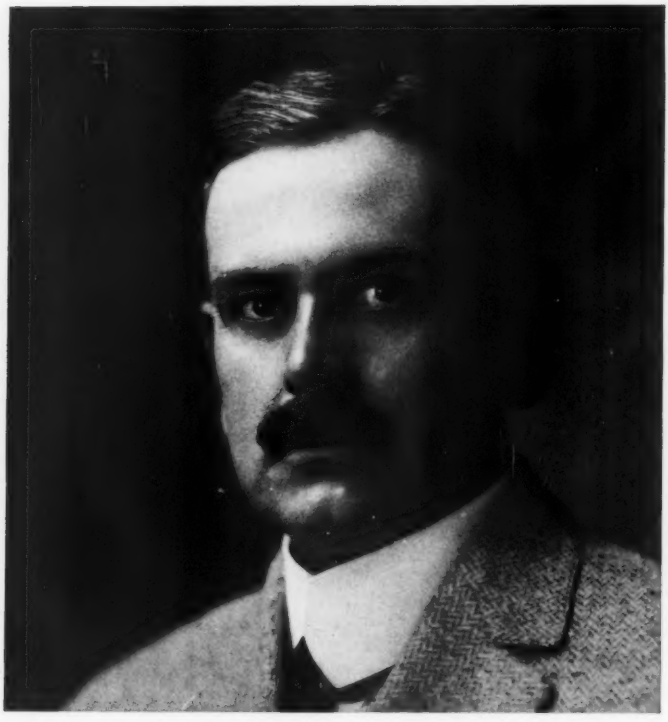
320 MILES OF SHADE TREES

FIFTY-SEVEN cities and towns in Massachusetts have determined to cooperate in a wholesale planting campaign. This movement was started by the Massachusetts Forestry Association and local interest was aroused in each place situated on a Circuit consisting of State Highways and of city and town streets. This Circuit begins at Boston and passes through the cities of Worcester and Springfield on to Pittsfield and North Adams near the New York State line. From North Adams, the trunk line of the State Highway is followed through the northern half of the State connecting Greenfield, Fitchburg and the historic towns of Concord and Lexington. From Lexington, Massachusetts Avenue closes the Circuit passing through old Cambridge to the starting point on Commonwealth Avenue, Boston. This circuit is approximately 320 miles in length and is one of the most delightful drives in the Commonwealth.

Nearly 100 miles of the line wind through the Berkshire Hills. In passing over it one encounters Jacob's Ladder a few miles west of Springfield. This Ladder is an interesting piece of highway and consists of a series of rising and descending gradients in passing over the height of land. Almost immediately after leaving the Ladder one finds himself among the beautiful old estates of Lenox and Pittsfield. Facing eastward at North Adams, the famous Mohawk Trail is seen winding its way to the top of Florida Mountain in the Hoosac Range, the highest point on the State Highways. To reach this height requires a constant climb for 3½ miles. When this point is past the traveler coasts, if in an automobile, for several miles through the wild rugged canyon of Cold River. This is one of the most picturesque bits of scenery in the state.

On the whole this Circuit is already one of the most popular drives in the state. Improved roads all the way make it very attractive to tourists and thousands of these visitors cross the state each year in automobiles by this route. While this highway is already very attractive and comfortable to the traveler, it is proposed to make it more so by planting shade trees and ornamental shrubbery along all the sections where they do not now exist. There are many places especially in the Berkshire Hills where nature has already done more than man could do to make this highway beautiful and these sections will not be touched. There are cuts and embankments to be sure which of course will be given attention and will be planted to vines, shrubbery, or trees as the individual case demands.

After the idea had been given due publicity a Conference of official delegates from the cities and towns traversed by this Circuit was called by the Association. This Conference was held in Worcester, May 8th, and ways and means were discussed by which the task could be accomplished. A Circuit Tree Planting Committee was elected by the Conference and clothed with power to make surveys, plans and estimates and to execute the work in cooperation with all of the cities and towns on the Circuit.



Forest conservation has passed the inspirational stage. It calls for concrete measures; founded on justice, workable in practice.

Growing new forests is an enterprise governed by business considerations. So is conservation handling of existing forests. Speculation is mostly over. Timber-owning from now on is nothing but the expensive carrying of raw material until it can be manufactured profitably.

To perpetuate forest resources demands that forest industry be guaranteed prosperous and stable footing. It must have safety from ignorant prejudice, also a lively constant use of wood at a price paying for protection and production by proper methods.

We lack this today. Paradoxical as it may seem, forest conservation's most urgent need is for a better lumber market. The reverse means sacrifice, waste, and consequent early extinction. What has no value, we do not save.

Successful measures affecting forest affairs must be based on intimate knowledge of the business they involve. Citizens, states, and congresses now deal too much with forest problems in an ignorance no man of them would tolerate if it affected his own business.

The remedy lies in education; not so much in the importance or technique of forest production as in its business necessities. When we have this, and not before, will we have an American forest policy that coordinates Federal, State and private effort.

To further such education is the chief duty of every sincere forest agency, private and governmental.

E. T. ALLEN,
Director American Forestry Association.

Conservation strictly speaking means protecting against loss or injury. As applied to natural resources in the propaganda of the past ten years it first meant forest preservation by "wise use." Its present day application includes not only all natural resources, both commercial and scenic, but human life and energy. The result is a somewhat indefinite promulgation of theories and policies, which lose force by variance from the original conception of conservation, and by the distribution of the educational effort over too many fields and subjects.

Forest conservation never meant "preservation" in the sense of not using the forests, although this interpretation is still given. Proper forest conservation means using the mature forests and producing other forest crops on the land. This makes forest conservation a purely economic problem. The end desired cannot be attained unless it is profitable, and up to the present, with a few minor exceptions, it has not been possible to make capital yield a reasonable return from conservative forestry. Mature forests are still available at much less than the cost of production, prices for forest products are too low, close utilization is not possible, and carrying charges are too high and too uncertain. With the mere ownership of mature reserve timber threatening the solvency of timberland owners, it is useless to talk about investing capital in forest production from the seedling or volunteer young growth stage.

One unfortunate result of the forest conservation agitation of the past decade is that it inspired speculative buying of timber, with the expectation of large returns because of the dwindling supplies. The phantom of timber famine has never been very real, and its use as a bugaboo or club has been a boomerang. Another result of the talk of timber scarcity is that it has given an excuse for an unjustified use of substitutes, and created a wide spread feeling that it is a public duty to use building material other than wood. The reduced sales of lumber cause lower prices, and put the possibilities of conservation farther away than ever. Conservation that does not pay will not conserve. The country needs economic, not sentimental forest conservation.

E. A. STERLING,
Director American Forestry Association.

HARRISBURG'S MUNICIPAL FOREST

By HARRY J. MUELLER

APRIL 23rd last, was a "red letter" day for Harrisburg, Pa. Thousands of school children set out about 5,000 white pine seedlings, as a nucleus the citys' municipal forest. There have been many Arbor Day proclamations and many exercises on a small scale in the State, but never was there a planting in which so many school children participated carried out so successfully. Can you imagine two thousand children marching from

TWO THOUSAND HARRISBURG, PA., CHILDREN ON THEIR WAY TO PLANT FIVE THOUSAND WHITE PINE SEEDLINGS IN THE FIRST MUNICIPAL FOREST IN PENNSYLVANIA

EACH CHILD MADE A HOLE IN WHICH TO PLACE A WHITE PINE SEEDLING

their school through green woods to do their part in setting out little pine trees? Nature was all dressed uy for the occasion; the showy flowers of the dogwood and Judas tree dotted against the pale green background of the bursting leaf buds of the elm, sassafras, maple and oaks, made a glorious picture. The floor of the woods was beautifully carpeted with young shoots of grass and myriads of wild flowers.

Gathering the children into a large circle in an open place, the exercises were opened by singing "Pennsylvania." Miss Mira L. Dock, of the American Forestry Association and Chairman of the Forestry Committee of the General Federation of Women's Clubs, addressed the children. Being formerly a Harrisburger, she told of her joy in being back again to help with what she termed, "the realization of her fondest dream—restoring Wildwood to its natural beauty." In appreciation of her remarks the children sang "Planting a Tree."

FORESTER MUELLER DISTRIBUTING TREES TO THE CHILDREN

Deputy Commissioner of Forestry of the State of Pennsylvania, I. C. Williams, then told the children that

"the preservation of the beautiful park depends upon you, and unless you plant trees each year to replace the old ones that die, this will soon become a barren waste."

J. Horace McFarland, President of the American Civic Association, added a few remarks on the taking care of our trees. He asked the children, "Did you ever cut down a tree," then followed with "Did you ever grow one? You could perhaps cut down in two hours any of these forest giants which took two or three hundred years to build."

LITTLE GIRL PLANTING A SEEDLING IN A HOLE SHE HAS DUG

After a short instruction on the history of the white pine tree from the seed until it is ready to set out, and how to "plant a tree" the children formed a line and began singing "America," as the column moved slowly toward the plantation. As each child took his place beside a hole, already prepared to receive the tree, a corp of men distributed the trees which had been previously puddled, but only to children that stood at the holes. This avoided any confusion, and the roots of the plants did not dry out.

"Mister, I have a hole."

"Mister, give me a tree."

"How do you plant it."

"Mister, is this right?"

These were the questions heard from all sides. It truly was a wonderful sight to see these kiddies spread out over a couple of acres patiently waiting for their trees. Their faces rivaled the wild flowers in the tall grass. And such care— no dolly was ever more tenderly handled than were these little trees, as they were placed in their last resting place.

Everyone was alive with interest. After the planting came the marking of their trees. Rows of stones, fences of broken sticks, most every plan that a child's mind could devise was in evience. The plot resembled an Indian burying ground after they left.

READY TO PLANT THE SEEDLING. EACH OF THE 5,000 PLANTED WAS ABOUT THIS SIZE

It was rather remarkable how well the work was done. Only a few of the trees had to be planted over. As a whole, the little girls did better work

I. C. Williams, Deputy State Forestry Commissioner, Showing a Little Girl How to Plant One of the White Pine Seedlings

than the boys. As the planting was limited to one of the largest schools of the city, a certain sense of rivalry was displayed by the ones not included in the exercise. Pupils from other schools passing by were invited to join in, but they said, "We'll show you we can plant ours better than you when our turn comes."

It is the plan to mark each schools' work and carry these plantings every fall and spring Arbor Day until all the waste places now given over to growing weed trees like Aspen, Maple, Alders and Birches will be reclaimed to more desirable species, and a forest primeval is again established.

Considering the proposition from a commercial point of view, under systematic management, the annual returns from the sale of timber from this park should more than pay the expenses of maintenance.

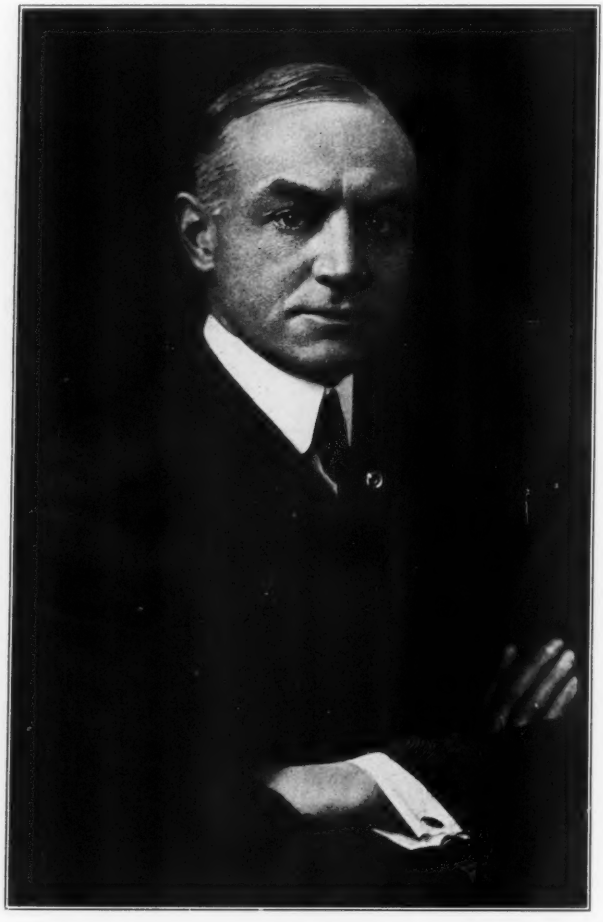
A NEW CONSERVATION COMMISSIONER

MR. George D. Pratt, of Brooklyn, N. Y., has been appointed by Governor Whitman as head of the reorganized Conservation Commission of New York State. In making his selection for the office, Governor Whitman has chosen an active and prominent conservationist, for Mr. Pratt has for many years been closely identified with many phases of the movement.

The appointment was received with general satisfaction throughout the State and especially by members of the Camp Fire Club of America of which organization Mr. Pratt is the President. The work will undoubtedly be most congenial to him, as he has given much study to it for several years and his practical experience derived as an officer and member of several associations devoted to conservation will be of great value to him in his new work. He has recently been the recipient of thousands of messages of congratulation and encouragement following the announcement of his appointment.

The appended memorandum of Mr. Pratt's activities and connections indicates how closely he has given his attention to conservation matters:

President, Camp-Fire Club of America; Member, Boone and Crocket Club, Aero Club, American Bison Society,



GEORGE D. PRATT

RECENTLY APPOINTED BY GOVERNOR WHITMAN AS HEAD OF THE REORGANIZED CONSERVATION COMMISSION OF NEW YORK STATE. MR. PRATT IS ONE OF THE LEADING CONSERVATIONISTS OF THE COUNTRY

American Museum of Natural History, Century Club, New York Zoological Society, National Sculpture Society, New York Yacht Club, Piping Rock Club, Seawanahka-Corinthian Yacht Club, Wild Life Protective Fund; Member Committee on Admissions, University Club, New York; Chairman, Physical Department Committee, International Y. M. C. A.; Chairman, Central Branch (Brooklyn) Y. M. C. A.; Treasurer, Boy Scouts of America; President, Brooklyn Council, Boy Scouts of America; Member, Public Recreation Commission, City of New York; Vice-President, Brooklyn Institute of Arts and Sciences; Member, National Society for the Promotion of Industrial Education, American Association for Labor Legislation, National Conservation Association, National Association of Audubon Societies, Society of Sanitary and Moral Prophylaxis; Treasurer, Pratt Institute, Brooklyn, N. Y.

Commissioner Pratt has announced the appointments of Llewellyn Legge as Chief Protector in charge of the Division of Fish and Game, Clifford R. Pettis as Superintendent of Forests, William C. Howard as Assistant Superintendent of Forests, and A. S. Houghton, of New York, City as Secretary to the Commission.

Commissioner Pratt at the same time announced the appointment of eighty-six forest and district rangers and mountain watchman. Marshall McLean of New York has been designated by the Attorney General as counsel for the Commission.

FOREST HOMES

SECRETARY of Agriculture Houston has promulgated a set of regulations for administering the new law which provides that National Forest land may be leased for summer home sites and other recreational purposes in tracts of 5 acres or less for periods not to exceed thirty years. This law supplements the revocable permit system under which recreational use of the forests already had developed considerably. Many users have been unwilling to make substantial improvements because of the uncertainty of tenure involved in the old form of permit, which, however, is still expected to meet the requirements of persons who are not likely to occupy the land for more than a few years, or to make elaborate improvements.

The primary object of the "term permits," as the leases are called, is not to obtain revenue but to promote the use of National Forest land for recreational purposes, say the regulations. At the same time, since permittees receive special benefits, it is regarded as only fair that they should reimburse the government for the expenditure incurred in administering the Forests. The rates range from $5 a year up, in accordance with the location of the land, the demand for it, and the use to which it will be put. The District Foresters are authorized to grant permits to applicants who intend to make improvements costing less than $1,000 and to use the land for a period not longer than fifteen years. All other permits will be approved by the Forester at Washington.

Applications must be filed with the Supervisor of the forest affected, designating the location of the land desired, the use to be made of it, and the approximate cost of contemplated improvements. Examination and survey of the land will be made by the Forest Service free of charge. An application for a hotel or summer resort site must be accompanied by plans and specifications of proposed structures and a statement as to their probable cost. The law stipulates 5 acres as the maximum, and it is believed that much less than this will suffice for most persons, but permittees will not be placed close together except when it is necessitated by heavy demand for land in a particular locality.

W. GOODRICH JONES OF TEXAS

ON JUNE 1 the new State Forestry law in Texas went into effect, and in a short time, following the selection of a State Forester and the organization of his department, the State will begin to make the progress which always follows good forest management.

The passage of this forestry bill was largely due to the efforts of W. Goodrich Jones, of Temple, Texas, who has been elected president of the newly organized Texas State Forestry Association in recognition of his interest and his labors in the cause of forestry. Mr. Jones as a youth spent two years at school in Dresden, Germany, and there he became imbued with the German love of forestry. Later he visited most of the forests and forest schools in Germany and Austria, and also spent much time in the forests in the west and northwest in this country. His love of the woods has led him to build a summer home in the Pecos National Forestat Cowles, New Mexico, some 8,000 feet above sea level.

W. Goodrich Jones of Texas

ELECTED PRESIDENT OF THE RECENTLY ORGANIZED TEXAS STATE FORESTRY ASSOCIATION, AND AN ENTHUSIASTIC ADVOCATE OF FOREST CONSERVATION

He has been a member of the American Forestry Association ever since its organization and at one time was one of its vice-presidents, representing Texas at the Governor's Conference called by President Roosevelt. Twenty years ago Mr. Jones was instrumental in having Texas pass an Arbor Day bill. Fifteen years ago he was commissioned by the United States Forest Service to make a report on the standing timber in Eastern Texas and how long it was likely to last, and he has never relaxed his interest in forestry not only in his own State but throughout the entire country.

So, when it became apparent that Texas must protect her forest resources by the creation of a State Forestry Department and the passage of a State forestry law, Mr. Jones was the logical man to lead the movement. He secured the assistance of Senator Morris Shep-

pard and through Senator Sheppard, Mr. J. G. Peters of the Forest Service was sent to Texas to outline the need of a forestry law and submit the draft of a forestry bill to Governor-elect Ferguson, the legislative committee and others who were interested. Dean, E. J. Kyle of the State Agricultural and Mechanical College; J. C. Dionne of the Gulf Coast Lumberman of Houston; Dr. W. B. Phillips, State Geologist, and Richard F. Burgess of El Paso all gave their assistance, while the American Forestry Association aided by means of a publicity campaign in arousing a demand for a State Forestry law. It was not an easy matter to get the bill passed. The House Committee favored it by the scant majority of one; and while the bill passed the House by a good majority, it got through the Senate by only one vote. Then Governor Ferguson hesitated about signing it, and for a time it looked as if he would not. Mr. Jones at once notified all who had worked for the bill, and the Governor received messages urging him to sign, while a committee consisting of Mr. Jones, President Bissell of the A. & M. College and Dr. Wm. B. Phillips called personally to impress upon the Governor the necessity of a forestry law, and finally he signed it.

Later the Texas Forestry Association was permanently organized, and Mr. Jones was elected its first president, a position he is certain to fill with credit to himself and to the association.

A LARGER AMERICAN FORESTRY

STARTING with the August number, AMERICAN FORESTRY will be enlarged from its present size, 6¾ by 10 inches, to 9 by 12 inches, thereby giving a much larger page, making it easier to handle and read, and permitting better illustrative work, which is so necessary and desirable in presenting to our readers the best that can be given in photographic reproduction of all the many phases of forest and tree conditions.

That the continued improvement of the magazine during the last several months is being appreciated by the readers of the magazine is apparent. Its increased value as a medium of education in all that pertains to trees and forests is indicated by the steadily growing demand for it, not only by individuals but also by schools and colleges.

With the August issue, still further improvement will be made and a still greater educational value will be given by the inauguration of a series of thoroughly well written and illustrated articles, each relating to one variety of tree and telling all about it, from the simpliest way to identify it to all its varied commercial uses.

The cover of the enlarged magazine will be a picture in color of a tree together with its bark, leaf and bud, a different tree being pictured each month.

These improvements will make the magazine more instructive and valuable, and it will become a necessity to anyone interested in trees, woodlands and forests, and desiring the best articles and information about them.

OREGON FOREST STUDENTS

SINCE the organization of the Oregon Forest School in 1909, it has been the practice of those in charge to take the students, each spring, for a field trip of about two weeks, into the forests of the Cascade Mountains. Special trips by classes in management, mensuration, logging and silviculture are of course made during the year, but it has been found that taking the whole crowd to the woods tends to produce an esprit de corps which can be created in no other way. The effect of having all the men joined on one piece of work unites them in a very wholesome way. The freemasonry engendered by the camp fire, the cook shanty and the last sack of tobacco is well known to all woodsmen.

In past years field work has been in the nature of practice work, of value only to the fellow who did it. This year a cooperative arrangement was entered into with the Federal Forest Service to the end that the energies of the seventy embryo foresters and logging engineers who made the trip should produce something of permanent value. Supervisor Brundage of the Santiam National Forest had a reconnaissance project which, through lack of funds, had not been completed. Mr. Brundage had work to do and the Forest School had the men to do the work. With these very simple fundamentals a working agreement was made which produced eminently satisfactory results.

The Forest School men went by train to the little logging town of Detroit, and from there packed their blankets 12 miles by a rough mountain trail to the camp site on the Breitenbush River. The Breitenbush, which rolls "white water" nearly its entire course, is a picturesque mountain torrent. With the stately Douglas firs, towering 200 feet and more above them, and with a dozen sulphur hot springs gushing boiling water near them, the foresters had an ideal location for their headquarters camp.

The area which was to be cruised had never been surveyed, so the Forest Service officials have run control lines

OUR WOODS PILOT

The Oregon Forest Students in the Woods

A Crew Ready to Hit the Trail

AN ESTIMATING CREW

STUDENTS OF THE OREGON FOREST SCHOOL. THESE CREWS, USUALLY OF FIVE MEN EACH, ARE IN CHARGE OF THE UPPER CLASSMEN

with transit and stadia along the principal ridges and streams. Between these meandered lines the cruise lines were run, due north and south or east and west, as conditions required. A 10 per cent cruise was made, using the familiar Forest Service gridiron method. Distances between control lines were chained except where, in a few cases, men were experienced enough to pace. Pacing, in this country, was no easy task, since the ground was pretty thickly strewn with down timber and since, on nearly every line, there was a difference in elevation of one to four thousand feet. Elevations were taken with aneroid barometers, checked by an instrument read every half hour in camp.

The estimating crews, usually consisting of five men each, were in charge of upper classmen, who, in addition to acting as straw bosses, did the topographic work. Another man ran compass and carried the head end of a chain or paced, another tallied, while two rooks, armed with Biltmore sticks, took diameters and threw them into the tallyman. Five Forest Service men and three Forest School professors acted as inspectors of the whole job. None of the inspectors got lost, but occasionally a crew was lost by the inspector.

To the forestry student of the Eastern United States, this cruising expedition would sure have been some experience. Imagine estimating trees up to 8 feet in diameter and 225 feet high, and fancy areas of this stuff going better than 150,000 board feet to the acre. Besides, the little area of 10,000 acres cruised out, was a veritable arboretum. Douglas fir, western hemlock and western red cedar were the principal species. But shot in among them, here and there, were mountain hemlock, Engleman spruce, incense cedar, noble fir, lovely fir, western grand fir, white pine, lodgepole pine, whitebark pine, yellow cypress, western yellow pine and western yew, with alder, and Oregon maple along the streams. To add interest to the work, an occasional deer was sighted, and fresh elk tracks were seen, while one crew got great amusement for a half hour, watching a black bear eat grass in an open glade.

FOREST FIRE "DON'TS"

TO OBTAIN the cooperation of the public in preventing forest fires which are doing a great deal of damage in the East this spring, the United States Forest Service has prepared ten "DON'TS" to be observed in the woods. It is hoped that these rules may have a beneficial effect during the fire season of the Southern Appalachians, which is not yet over, and that of the north woods, which is just beginning and which, from present indications, promises to be unusually severe.

Many thousands of acres of forest and suburban woodland from Maine to Florida, and from the Atlantic coast as far West as Arkansas, have been burned over already this spring by fires which started for the most part from preventable causes. On the National Forest purchase areas alone, forty-nine fires occurred in March, burning over more than 6,500 acres, while forty-four fires starting on private land near or within government boundaries damaged nearly 5,500 acres. Fires in April were even more numerous and severe, but rains in the latter part of the month helped the situation somewhat. Fire statistics for April are not yet available.

THE "DON'TS"

1. **Don't throw your match away until you are sure it is out.**

2. **Don't drop cigarette or cigar butts until the glow is extinguished.**

3. **Don't knock out your pipe ashes while hot or where they will fall into dry leaves or other inflammable material.**

4. **Don't build a camp fire any larger than is absolutely necessary.**

5. **Don't build a fire against a tree, a log, or a stump, or anywhere but on bare soil.**

6. **Don't leave a fire until you are sure it is out; if necessary smother it with earth or water.**

7. **Don't burn brush or refuse in or near the woods if there is any chance that the fire may spread beyond your control, or that the wind may carry sparks where they would start a new fire.**

8. **Don't be any more careless with fire in the woods than you are with fire in your own home.**

9. **Don't be idle when you discover a fire in the woods; if you can't put it out yourself, get help. Where a Forest Guard, Ranger, or State Fire Warden can be reached, call him up on the nearest telephone you can find.**

10. **Don't forget that human thoughtlessness and negligence are the causes of more than half of the forest fires in this country, and that the smallest spark may start a conflagration that will result in loss of life and destruction of timber and young growth valuable not only for lumber but for their influence in helping to prevent flood, erosion, and drought.**

EDITORIAL

MORE EASTERN FOREST RESERVES

A NUMBER of the leading organizations of New England and of the South Atlantic States will be asked to join the American Forestry Association in the effort to secure the passage by the next Congress of an act providing for an appropriation of $2,000,000 a year, for a period of five years, to be used in the purchase of forest land in New England and the Southern Appalachians as forest reserves.

By the end of this year, when the present appropriation will be exhausted, about 1,200,000 acres of this land will have been secured. A total of some 5,000,000 acres is needed. That is the amount of acreage recommended by Secretary of Agriculture Houston. The National Forest Reservation Commission endorsed the recommendation. Every thinking citizen who can judge by present conditions in deforested countries what the future holds for New England and the Southern Appalachian territory if the forest land is not preserved also heartily approves the plan to increase and extend the forest reserves in these districts.

AMERICAN FORESTRY asked Governor Locke Craig of North Carolina his opinion and Governor Craig said: "The Appalachian Mountains are covered with forests nowhere excelled. The luxuriance of the vast wooded areas contribute largely to the grandeur of the scenery. The views from mountain peaks are magnificent beyond description and are restful and pleasing on account of the richness and beauty of the foliage. These forests are about to be destroyed. They are very valuable for lumber. The individuals and corporations who own them have, as the law now exists, the right to cut them down. They are mowing them down as a field of wheat is mowed. The debris left upon the ground soon becomes very dry and there is a great deal of it. It is impossible to prevent fires in this inflammable material. After these mountains have been cut over terrific conflagrations sweep the whole country, destroying every living thing. Instead of mountain peak and ridge and slope, covered with a wealth of primeval forest, there is vast desolation. I have seen this myself.

"The Appalachian Mountains constitute the source of our rivers that water the plains and turn the wheels of industry. When the forests on the mountains are destroyed the water supply is no longer conserved. When the rains come the torrents rush down and wash away the fertile lands and destroy the efficiency of the streams.

"The Government can render a lasting and invaluable service to the country by the protection of these forests."

Governor Craig hits the nail on the head in his last sentence. Furthermore it is the duty of the Government to provide for the future welfare of the people and it can perform no more valuable service than by providing for the protection of these forests lands—such protection indeed is vitally important, and should not be delayed.

Governor Rolland H. Spaulding of New Hampshire not only approves of what purchases have been made in his State but advocates further purchases without delay. He says to American Forestry:

"I am glad to accede to your request for an expression of opinion, personal and official, as to the necessity for acquiring more Federal Forest Reserves in the White Mountains.

"The importance of protecting the forest covering at the sources, in the New England region, of our chief New England rivers, is daily becoming more evident and more widely appreciated. Purchases of land already made for Federal Forest Reserves in this territory have been wise and timely, but insufficient. For the sake of economy in

the purchases and for the sake of doing the remedial work as rapidly as possible, now is the time to act."

Now is the time to act, as Governor Spaulding says. The work has been well started and it should be continued. It is safe to say that the citizens of every New England and every Southern Appalachian State wish it continued and will petition their Senators and Congressmen to vote in favor of providing the $10,000,000 desired for the increase in these forest reserves during the next five years.

LUMBER WASTE IN THE WOODS

COMMENTING upon a photograph of piles of cordwood and fagots in a German forest, published in the May issue of AMERICAN FORESTRY, Mr. Frank A. Cutting of Boston, Mass., a lumberman, voices the feeling of practically all lumbermen in his remarks. The photograph called attention to the fact that the cordwood and fagots so well utilized by the Germans are usually wasted in American woods and forests.

Mr. Cutting expresses the situation thoroughly well when he says in his letter: "All lumbermen in the United States would be glad to utilize their waste if it could be done, but the fact is that the American people have been taught to burn coal, use gas and electricity, and there are only few localities, populated by foreigners, who will use wood at all, and they are able to pick up waste materials in cities to quite an extent. The railways are not interested in having waste products from their woods utilized as fuel; they wish to sell the coal that is in the mines they own, and they encourage use of coal and discourage the use of wood. Freight rates are high on wood waste for fuel and it is impossible to use it to any extent.

"I am operating a tract of land in the Adirondacks and I would be glad to give any one all the waste material they wanted at 25 cents per cord of 128 cubic feet, if they would take it away, and there is some of the waste material I would be pleased to give them for nothing if they would move it. All lumbermen would give away their defective trees if they could get anyone to cut them down and take them away. It is not the lumberman who is to blame because waste material is left in the woods; he would be very glad to have this waste material removed and utilized."

Mr. Cutting is quite right, it is not the lumberman who is to blame for waste material in the woods. If he could get it out at even a very little profit the lumberman would do so. But he cannot. It would be better for the forest if he could, for thus one forest fire danger would be removed. Perhaps some day when utilization of wood waste has reached the point where value is secured from every portion of the tree the present condition will be overcome.

One hesitates to think of what suffering would be saved the very poor in big cities during the winter if the hundreds of thousands of cords of waste wood now annually left to rot in the forests could by some means be made available for their use.

FOREST NOTES

Beginning June 7, the department of forestry at Cornell will offer instruction during a full summer term, in addition to the regular winter terms heretofore conducted. The first six weeks of the term, it is announced, will be spent at Ithaca, and the remainder of the time, up to September 22, will be in camp on a large forest tract in the Adirondack mountains. The courses offered form a regular part of the specified work for professional students of forestry in the college, though the courses will be open also to those who have had three years instruction at Cornell, or its equivalent. The subjects include timber utilization and measurement, silviculture, forest management, and advanced research into various other forest problems. Because of the advantages of summer work, especially in a fully timbered area such as the Adirondacks, certain of the courses offered will be given hereafter during the summer term only.

In addition to the summer work in the woods the students are required to spend the ensuing fall in getting practical experience in the logging woods, returning to Ithaca to finish their college course in the spring. Those who take graduate training for the degree of master in forestry, must have an additional summer term in the camp in the woods, and then one more term at Cornell, to be graduated in February in time for the examinations for the Federal Forest Service, or for the beginning of spring activities in state or private employ. The alternation of class room and laboratory study with practical work in the field during the final years at the University is believed by those in charge of the course to offer a desirable arrangement not only from the standpoint of thorough instruction in forestry, but also it is said to appeal to men seeking thorough technical training.

Secretary of Agriculture Houston has completed an extensive tour of the National Forests to find out for himself to what extent their timber, forage, water power, recreational and agricultural resources are being developed for the public under present methods and to make a study of the administrative problems of the Forest Service. During May he visited the forests in several of the Western States, spending almost the entire time of his trip in the wilds, seeking first-hand impressions of the conditions under which the Forest Service works.

Conditions on the National Forests during the summer are likely to be unusually arduous, according to Forest Service officials, in that a dangerous fire season is indicated for many of the forests by the abnormally slight precipitation of the winter. Unless the deficiency is made up, the forests will be dry and inflammable earlier in the season than usual and the water supply of many extensive regions will be low. Numerous irrigation, reservoir, and power projects are wholly or in part dependent on National Forest protection of watersheds, and it is beginning to be generally understood that, aside from actual farming on National Forest land, the agricultural interests of the West are much concerned in the conservation of water supplies accomplished by the Forest Service through lessened fire damage and regulated grazing. In Southern California the interest in maintaining a forest cover on the mountains from which local water supplies are derived is so keen that for a number of years local funds have been raised and paid over to the Department of Agriculture in order to provide for more intensive protection than the federal appropriations make possible.

Under the methods employed in handling the livestock grazing business of the National Forests, agricultural development is benefited not only through the prevention of injury to watersheds but also through the opportunities opened for ranch development. As new settlers locate near the forests room is made for their stock by cutting down, if necessary, the number of stock allowed the larger permittees. More than 16,000,000 cattle, sheep, and hogs, including young stock, will find forage this year on the National Forests. The revenue from this source is expected to exceed $1,200,000 in 1915.

One of the difficult administrative problems, now being rapidly worked out on the National Forests is that of agricultural development of land more valuable for farm than for forest purposes. Extensive land classification has been made possible by a special appropriation of Congress for this purpose, renewed each year since 1912. Up to date, about 16,000 agricultural homesteads have been listed within the National Forests, opening to agricultural development nearly 1,700,000 acres of forest land. In addition, a certain amount of agricultural development is provided for under special use permits, where for any special reason listing does not afford a practicable means of meeting settlers' needs.

More than 37,000 special use permits of all kinds have been issued to the public since 1905, granting free, or for a reasonable charge, permission to conduct all sorts of enterprises on National Forest land. They include apiaries, barns, boat houses, botanical gardens, cemeteries, churches, cottages, golf links, hotels, mines, mineral springs, observatories, orchards, quarries, railroads, ranches, residences, restaurants, rifle ranges, roads, sanitariums, sawmills, slaughter houses, telegraph and telephone lines, tennis courts, tramways, tunnels, water power plants, wells, weirs, and

wharves. The total income from special use permits in 1914 was over $131,000.

Farmers, prospectors, and local settlers of all classes, who needed timber for their own use in the construction of houses, barns, fences, and the like, were given free more than 120,000,000 feet of National Forest timber during 1914, while about 14,000,000 feet was sold to settlers, ranchers, and others at cost prices. The timber sale business of the National Forests amounts to about $1,250,000 annually, more than 1,500,000,000 board feet of stumpage having been sold to lumber operators last year.

The National Forests contain most of the picturesque wilderness in the country, and their recreational resources are practically unlimited. More than 2,000 cottages have been built on the forests by summer residents under the permit system, which has been supplemented by a law providing that tracts of 5 acres or less may be leased for periods not to exceed thirty years. This law, under which leasing regulations have just been promulgated by the Secretary of Agriculture, is expected to stimulate recreational development of the forests. Already a large number of applications to lease National Forest land for summer residence sites have been received, and even communities are beginning to take advantage of the forests situated near them by obtaining tracts for use as picnic, camping, and playgrounds.

The State-owned lands in the Adirondacks and Catskills must eventually become a very productive forest area giving large returns to the State not alone from the products of the forest but as a tremendous reservoir for water storage and as a recreation place for all the people of the State. For a number of years the question of how to handle safely and effectively these State-owned forests has been before the people in one form or another. During the past year the Faculty of The College of Forestry at Syracuse, made up of fourteen graduate Foresters, has been giving this whole question careful study and there have been regular discussions held every week or two taking up every possible phase of the question. From these discussions there has come gradually the idea that the only safe way in which to treat the forest lands of the Adirondacks and Catskills as a great State resource is to place them under a Constitutional Conservation Commission.

New York leads all the other States in the Union in lumber consumption, with a total annual bill for timber of all kinds of over $100,000,000. Enough wood is used annually in the industries of the State to make a board walk 1,000 feet wide and 1 inch thick from Syracuse along the New York Central to New York City and part way back.

In the United States as a whole four-fifths of the standing timber is privately owned, and one-fifth is owned by various States and the Federal Government. New York owns one-fifth of the forest land of the State and one-fourth of the standing timber. Owing to a clause in the Constitution this timber can not be cut even though it is dying or dead and a menace to healthy timber about it.

H. S. Betts has been appointed Chief of the Office of Industrial Research of the Forest Service and reported in Washington early in May. He takes the place of O. T. Swan, who recently resigned. Mr. Betts had been connected with the Forest Service Laboratory at Madison, Wis.

Out of a total of 142 forest fires this spring in eighteen counties in Kentucky where there are Forest Wardens, seventy-eight were caused by burning brush; by hunters, ten; railroads, eight; saw mills, four; incendiary five; and thirty-four were of unknown origin. There were ten more fires during the spring up to April 30, than during the whole of 1914. While the fires in the aggregate did immense damage to younger growth, their discovery by the wardens prevented widespread destruction.

Thomas B. Wyman, Secretary-Forester of the Northern Protective Association at Munising, Mich., has devised a novel method of keeping before the eyes of men who go into the woods the necessity of taking precautions against forest fires. On the backs of playing cards which are distributed in packs by the Association, he sounds a warning, and on the faces of the cards each heart, spade, club and diamond, bears a brief but pointed sentence urging better care of the forests.

Chief Forester Henry S. Graves, who was on a tour of western forests with Secretary of Agriculture Houston, was called East early in May by the serious illness of his father Prof. W. B. Graves, of Andover, Mass. Mr. Graves fortunately was able to reach his father in time to be with him when he died.

The College of Forestry of the University of Washington was given the unanimous decision of the Judges as having the best exhibit at the Engineers' Open House, given on the campus at the University recently. The Judges were H. C. Gill, Mayor of Seattle; President Henry Landes, of the University of Washington; Kenneth C. Beaton, of the staff of the Seattle Post Intelligencer, and Almon H. Fuller, Dean of the College of Engineering.

Mayor Gill based his decision on the difficulty of bringing the great out-doors within the compass of a small room; President Landes complimented the Foresters on the amount of work accomplished in so short a time; Mr. Beaton gave the Foresters his vote because their exhibit was the most original; while Dean Fuller thought that the utilization of the material at hand was most clever.

United States Forester Coert Dubois, with headquarters at San Francisco, has decided to present badges to the Boy Scouts of Cali-

fornia who qualify this summer as National Forest Aids. To become eligible to receive a badge, the Scout is required to spend at least ten days in a National Forest performing useful service during the fire season under the direction of Federal Forest Officers. At the end of this period he has to pass an examination in elementary forestry.

The first Scout to receive the badge was a Mill Valley boy who worked in the Tahoe Forest last summer under Forest Supervisor R. L. P. Bigelow. He performed with credit the duties assigned to him, being specially complimented by Bigelow for his conduct at the Crystal Peak fire, and passed the examinations with a fair rating.

The badge is of bronze with the Forest Service pine tree in relief encircled by the words "National Forest Aide." The District Forester expects that a number of them will be earned by the Boy Scouts next season.

Each forest user on the Apache National Forest has been provided with a circular calling his attention to the danger of forest fires during the hot summer season and asking him to lend a helping hand to the Forest Service in the endeavor to prevent fires. He is asked to observe the following simple rules:

Dig a pit or clear trash from your camp fire and be sure it is out before you leave it.

Be sure your match is out before you throw it away.

Throw your cigarette or cigar stubs or knock out your pipe ashes where they cannot start a fire.

A little care is worth days of fire fighting.

If you discover a fire and cannot go yourself and put it out, will you please notify the nearest Forest Officer?

State Forester Chapin Jones, of Virginia, recently appointed, is inaugurating a campaign against fires in the woods, in which all citizens are asked to join. The first step is to get warning notices into the hands of people who have timberland to protect or who wish to put them up for the good of the cause. These are now being distributed and may be had by addressing the State Forester at Charlottesville, Va.

These notices are of three different kinds, and are printed in large letters on heavy cardboard, for posting indoors in stores, postoffices, blacksmithshops, etc., and on cloth for posting outdoors, along the roads and paths in the woods, etc., where anyone traveling through the woods would see them. They explain the State laws, which are strict, and call upon all citizens to be careful not to start a fire and to put out, if possible any that they may find burning.

The Conservation Committee of the New York Constitutional Convention held its first public hearing upon proposed amendments relating to the forests, fish, game, waters and other natural resources of the State at Albany, on May 18. The members of the committee are Charles H. Dow of Jamestown, Chairman; Edward M. Angell of Glen Falls, H. LeRoy Austin of Catskill, George A. Blauvelt of Monsey, George Clinton, Sr., of Buffalo, W. Barlow Dunlap of Amsterdam, Olin H. Landreth of Schenectady, Ferris J. Meigs of Tupper Lake, Rush Rhees of Rochester, Edward M. Smith of Watertown, James S. Whipple of Salamanca, and Arthur J. Baldwin, William P. Bannister, Timothy A. Leary, Louis Marshall, Morgan J. O'Brien, and John G. Saxe, of New York.

The war tax of 1 cent on each letter and post card mailed in Canada and the tax of 2 cents on each check and bill of exchange has been cheerfully met and everyone is anxious to help in every way possible.

Last summer the New Brunswick Railway Company removed all inflammable material from a narrow strip bordering the rights-of-way of the Transcontinental and Intercolonial Railways through their wild lands. Largely as a consequence of this, in spite of a dry summer, fires were confined to an area of less than 100 acres and only very few acres destroyed were burned by fires originating on the railroads. The method employed was to pile the debris on the right-of-way and burn it there. Care was taken to avoid scorching trees standing along the border of the woods.

In the speech from the Throne at the opening of the New Brunswick Legislature, announcement was made that a new act to provide for a complete and scientific survey of the seven million acres of Crown Lands at a cost of $400,000 would be introduced. It was announced that the survey would probably take three or four years to complete and would lead to a re-classification of the Crown Lands.

The Committee appointed by timber limit holders in the Upper Ottawa Valley to consider the formation of a cooperative fire protective association like those in the lower Ottawa and St. Maurice Valleys decided that they were too late to take action this year. Let us hope that Providence will forgive their procrastination and care for them and protect their timber this summer.

The Grand Trunk Pacific Railway has announced that contracts have been let and other arrangements made for the installation of crude oil burners on passenger locomotives on the section between Prince Rupert, B. C., and Jasper, Alta., a distance of 718 miles. It is expected that this installation will be complete by next June. Freight engines will continue to burn coal for the present.

CANADIAN DEPARTMENT

By ELLWOOD WILSON

His Royal Highness, the Duke of Connaught, has consented to act as Patron of the Canadian Forestry Association for the year 1915.

The Minister of Railways and Canals, the Hon. Frank Cochrane, is negotiating with the Provincial Governments of New Brunswick, Quebec and Ontario for the establishment of motor speeder patrols on the National Transcontinental and Intercolonial Railways. This will be a great step in advance and should go far to prevent forest fires being set by the railways. It is to be hoped that the good work will be continued and that the efficiency of Government owned railways will approach that of those privately owned. Mr. McNeillie, late with the C. P. R. has joined the staff of the Intercolonial with headquarters at Moncton.

The work on the big hydroelectric plant of the Laurentide Company, Ltd., which was temporarily suspended last fall has started up again and will be rapidly pushed to completion. The dam is 1,700 feet long with a maximum height of 90 feet and when completed will have six 20,000 horse power units. The St. Maurice River will be backed up for nearly 20 miles, and will be navigable for steamboats for 72 miles above Grand' Mère. This company is establishing a timber reserve by planting up lands bought for the flowage rights, 150,000 trees, mostly Norway Spruce, were planted in 1914 and have wintered exceptionally well. Two hundred thousand more will be planted this month and two to three hundred thousand this fall and as soon as possible 1,000,000 trees per annum will be planted which is the Company's present annual cut. An extension of one and one half acres is being made to the Company's nursery in which some experiments in tree raising will be carried out.

The reindeer imported by the Laurentide Company last summer have wintered well, but as they were travelling just before the rutting season no young were born. Two bucks were trained last winter and worked nicely in harness.

The students of the Quebec Forestry School are in their spring camp at Burrill's Siding on the Estate of Mr. G. C. Piché, Chief Forester of Quebec. Mr. Piché is also building a house for the use of the students at the Government Nursery at Berthierville, which will be a model of its kind. There has been a large demand for trees for private planting from this nursery and its entire output will soon be called for.

The Canadian Northern Ontario Railway is arranging to install an efficient fire protective system along its new line from North Bay to Port Arthur, in accordance with the requirements of the Dominion Railway Commission. There will be twenty-three special patrolmen with track velocipedes, and two head patrolmen with power speeders, covering portions of the line where the fire hazard is greatest. Where the situation will permit, the section men and other regular employees will perform such patrol work and fire fighting as may be necessary.

Davis W. Lusk, Jr., Yale Forest School, 1912, is at Calgary, Alberta, investigating fire damage for the Dominion Government.

Last season the Laurentide Company, Ltd., made some experiments with the Jenssen Tree Planter and found it so satisfactory that ten more planters were ordered this year and will be used in the planting operations. They were found faster than setting the trees by hand in holes made with a mattock or dibble and it was found that the mortality among the trees set with the planter was considerably less than among those planted in the old way. Comparative costs of the two methods will be published later.

Mr. R. R. Bradley, Forester of the New Brunswick Railway Company reports that several students who worked for him last season have enlisted. Among them is Mr. R. K. Shives, who has gone to Toronto to join the aviation corps. He was the first applicant.

The damage done by the spruce bud worm last summer was very serious throughout New Brunswick, much more so than during the previous summer. Spruce hillsides seen from a distance took on the same brown tinge that a severe scorching would give them. Over large sections of the St. John River and Miramichi valleys practically all the new growth was destroyed. It seems that the chief danger in the work of the insect lies in the weakening of the trees which must render them liable to attacks by more deadly insects, such as the bark beetle.

There is another disease attacking the fir and cedar and to some extent the pine in New Brunswick. The effect is to dry out and kill the twigs and branches and in some cases whole trees of these species. The branch instead of losing its needles, as when attacked by the spruce bud worm, will die, and turn a brilliant red until the needles fall off. This blight does not seem to affect the spruce.

Mr. R. H. Campbell, Director of the Dominion Forestry Branch, is taking another step in line with his progressive and creative policy for forestry work in Canada. He proposes, in order to bring together the organizations that are interested in forest research in Canada, and to systematize and develop it, to form in connection with the Dominion Forestry Branch, an Advisory Committee, which would include most of the leading men directly interested in forest research. The work of the Committee will be to suggest problems for investigation and methods of carrying out such projects: to pass upon all projects of scientific investigation planned and to revise for publication the results of such investigations. It is not proposed that any remuneration should be given for services on the Advisory Committee, nor that the Committee should meet as a whole at any time, but they should be consulted by correspondence. There may be a small executive committee of the Advisory Committee which will consider plans and proposed projects more in detail and have them put into proper form for transmission to the various authorities to whom the investigation would be suggested. As soon as it can be arranged a special officer of the Forestry Branch will take charge of the arranging and recording of the investigations that may be undertaken. The following have been invited to become members:

Dr. B. E. Fernow, Dean, University of Toronto Forestry School; to represent forest management and silvicultural aspect of forest research.

Clyde Leavitt, Forester; to represent Conservation Commission and forest protection researches.

W. N. Millar, Assistant Professor of Forestry University of Toronto Forest School; to represent Forest mensuration and engineering aspects of forest research.

R. B. Miller, Dean, University of New Brunswick Forest School; to represent Maritime Provinces.

Ellwood Wilson, Forester Laurentide Company; to represent Quebec private timber owners.

G. C. Piché, Forester Province of Quebec; to represent Quebec Provincial Government.

E. J. Zavitz, Forester, Province of Ontario; to represent Ontario Provincial Government.

H. R. MacMillan, Forester, British Columbia; to represent British Columbia Provincial Government.

L. M. Ellis, Forester, Canadian Pacific Railway; to represent Canadian Railways.

Dr. Judson F. Clark, Clark & Lyford, Consulting Foresters; to represent Private Foresters, both east and west.

F. W. Broderick, Professor Horticulture and Forestry, Manitoba Agricultural College; to represent farm forestry in prairie provinces.

J. H. White, Instructor, University of Toronto Forest School; to represent technological and botanical aspects of forest research.

Dr. C. D. Howe, Associate Professor, University of Toronto Forest School; to represent silvical aspects of forest research.

BRITISH COLUMBIA NOTES

Cooperation in fire protection along the International Boundary is being arranged between the U. S. Forest Service and the British Columbia Forest Branch. The plan includes on the United States side the Washington, Okanogan, and Colville Forests in District 6; the Kaniksu, Pend d'Oreille, Kootenai, and Blackfeet Forests in District 1; and in British Columbia the Vancouver, Vernon, Nelson and Cranbrook Forest Districts.

In the educational campaign for fire prevention this year the distribution of pocket whetstones to woodsmen of all kinds, and of sets of lantern slides to moving picture theatres will be continued. Their use last year was much appreciated and gave excellent results. About 20,000 of the whetstones and several hundred slides will be distributed. The whetstones bear an attractive inscription requesting care with fire in the woods. The design is copyrighted by the Western Forestry and Conservation Association, through whose courtesy its use is allowed.

A Ranger Station and launch depot is being built at Thurston Bay on Sonora Island. This is one of the many islands lying between Vancouver Island and the mainland, and is about the centre of the region where most of the logging on the coast has so far been done. Transportation in this part of the Province is practically all by water, and the work of protection and administration requires the use of a good many launches, large and small, by the Forest Branch. The launch depot is fitted up with ways, machine shop, storage sheds, etc., for looking after the launches, and its establishment will greatly facilitate Government work.

Some of the largest and best bodies of timber in British Columbia are situated around Cowichan Lake on Vancouver Island. A telephone line to facilitate fire protection will be built there in the near future by the timber holders and the Forest Branch in cooperation.

During the winter a number of the District Foresters have given special instruction and practice in cruising, surveying and scaling to their rangers. Such Ranger Schools, as they are called, are held in the field, camps being established in a locality offering opportunities for instruction in all the various lines of work.

The chance to improve their qualifications for forest work given by these "Ranger Schools" has been appreciated by the Rangers and other officers attending them. A number of Forest Guards were, on their urgent request, allowed to attend.

These Ranger Schools will hereafter be held every winter in each Forest District.

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Proceedings of the Society of American foresters, April, 1915.—Charles Edward Bessey, p. 113–14; Present condition of applied forestry in Canada, by H. R. MacMillan, p. 115–29; Forest administration in the southern Appalachians, by K. W. Woodward, p. 130–40; A study of Douglas fir seed, by C. P. Willis and J. V. Hafmann, p. 141-64; The beginnings in the development of a private forest estate in New England, by George H. Meyers, p. 165–74; Game on the national forests, by Smith Riley, p. 175–82; The entomological aspect of slash disposal, by Ralph Hopping, p. 183–5; Douglas fir and fire, by C. S. Judd, p. 186–91; The management of Engelmann spruce—al-

pine fir stands, by John W. Spencer, p. 192–8; A possible measure of light requirements of trees, by W. W. Ashe, p. 199–200. The clinometer on fire lookouts, by Donald Bruce, p. 201–6.

Quarterly journal of forestry, April, 1915.—Forestry in the British empire, by Wm. Schlich, p. 95–112; Present problems in American forestry, by W. B. Greeley, p. 112–27; Visit to the state school and forest of Vallombrosa, p. 127–33; The pitwood trade in the Midlands, by A. Slater, p. 134–7.

Revue des eaux et forêts, March 1, 1915.—La question forestière en Algérie, by Laporte, p. 553–63; Les forêts et la guerre, p. 573–4.

Tree talk, May, 1915.—A pest of shade trees; the whitemarked tussock moth, by W. E. Britton, p. 6–7; Cavity treatment, by F. A. Bartlett, p. 9–11; Reforestation of Long Island, by Henry H. Tryon, p. 13–17.

FORESTERS ATTENTION

AMERICAN FORESTRY will print free of charge in this column advertisements of foresters wanting positions, or of persons having employment to offer foresters

YOUNG MAN, expert in all branches of shade tree work and with forestry training, desires position as forester, arboriculturist or tree surgeon. References furnished. Address C. S., care AMERICAN FORESTRY.

FORESTER of technical training, six years' teaching and practical experience in different parts of the United States, wishes to better position. Best references from university and employers, and others. Address G. O. T., Care AMERICAN FORESTRY.

FORESTER with 15 years experience Estimating, Surveying, Mapping, and in the care of private holdings desires position. Perfectly reliable in every way, and with executive ability. Address "A," care AMERICAN FORESTRY.

WANTED—By Graduate Forester, position in forestry work in South, or Tropics. Slight knowledge of Spanish and German. Scientific or experimental work preferred. Address, "F. W. H." Care of AMERICAN FORESTRY.

A forest school graduate with experience in U. S. Forest Service and with lumber company, also possessing thorough business training, will consider offer of good forestry position. Address M., Care AMERICAN FORESTRY.

WANTED—Position by practical experienced man as tree surgeon. Am familiar with trees of all kinds. Special terms on orchard work. Terms reasonable. Small jobs will not be considered. Will send book upon request. Do not write for book out of idle curiosity. Address Box 6, care of AMERICAN FORESTRY.

POSITION WANTED—Engineer with twelve years' experience in Engineering and Forestry. Expert land surveyor, timber estimator, timberland R. R. location. Experienced in woods operation and good manager of men. Permanent position desired with Timber Company, Railroad Company or Private Estate. At present employed. Address Box 4, Care AMERICAN FORESTRY.

MAN with practical experience in lumbering, timber estimating, mapping and compass work. Have had one year of college training and would like position where there is an opportunity to acquire further knowledge of forestry. Address Box 7, care of AMERICAN FORESTRY.

ASSISTANT FORESTER—$1,500 to $1,800 annum. Limited to residents of New Jersey if a sufficient number of qualified candidates: if not, open to citizens of the United States without regard to residence. Candidates will be permitted to submit replies and papers in this examination by mail.

All candidates must be Professional Foresters with good, practical experience. Experience in woodlot management, in small lumbering and in shade tree work is desired. Subjects of examination and relative weights:

Experience and Education	6
Personal qualifications, age, character, etc	2
Paper on some subject pertinent to forest conditions in New Jersey	2
TOTAL	10

Communicate with CIVIL SERVICE COMMISSION, State House, Trenton, N. J.

A GRADUATE of one of the leading Forestry Schools of the country, with some experience in State and private work, would like to secure a position in some Eastern or Central State. Address S. G. H., care AMERICAN FORESTRY.

FOREST ENGINEER seeks position with an estimating firm or with a lumber company. Best of references. Address Forest Engineer, Care AMERICAN FORESTRY.

GRADUATE FORESTER—Practical experience in cruising, mapping and scaling. Eager to go anywhere. References furnished. Address R. L., care of AMERICAN FORESTRY.

PRACTICAL FORESTER wants situation on private estate. Has practical experience of sowing, laying, planting out, pruning, thinning, firebelts, ditching, rotation planting, mixed planting and thorough knowledge of fencing and tree felling. Has had seven years experience on best managed forestry area in Scotland. Address, "Raith," Care AMERICAN FORESTRY.

PRACTICAL FORESTER wants position with city Park Commission. Understands fully nursery work, planting, trimming and tree surgery. Best references and practical experience. Address "L. M. E.," Care AMERICAN FORESTRY.

WANTED—A position as an inspector of ties, timbers and lumber, by a forest school graduate with experience in inspecting ties, timbers and lumber. Can furnish best of references. Address Inspector, Care AMERICAN FORESTRY.

Graduate of Forestry School, having studied forestry and lumbering operations in this country and Germany, with experience in the U. S. Forest Service, and also in state and private nursery work, would like position with forest engineering firm or lumber company. Best of references. Address XY, Care of AMERICAN FORESTRY.

WANTED—A job as fire ranger or guard by a strong, healthy young man twenty-one years of age. Address "3" care AMERICAN FORESTRY.

WANTED—Position by a clean cut young man, with A-1 references, with a Forestry Expert or a surveying party, or any other business where a knowledge of the subject of forestry can be had. Address G. W. H., care AMERICAN FORESTRY.

WANTED—Position as City Forester or Park Superintendent. Willing to consider position as an assistant. University training; experience in forestry, nursery and landscape work. Twenty-seven years old and married. Best of references. Address "F. S." Care of AMERICAN FORESTRY, Washington, D. C.

SURVEYOR—Young man 23 years old, 2½ years experience as rodman and draftsman on preliminary, location and construction for western railroads, desires position of like nature where there is an opportunity for learning forestry. Location is immaterial. Address Box 5, Care of AMERICAN FORESTRY.

POSITION WANTED—Am graduate of Biltmore Forest School, with good record in survey, estimate and estate management and want position where I will have a chance to learn more. Have done practical work outside of school and am considered good at timber. Willing to go anywhere and be generally useful. Hard worker, don't mind long hours. Age, twenty-six. Give me interview or let me send references. Address J. U., care AMERICAN FORESTRY.

YOUNG MAN—Four years' practical experience in reforestation, nursery work, improvement thinning, fire protection and tree surgery, wishes position on private estate or for state or municipal work. Experienced handling men. Best of references. Address R. A., care AMERICAN FORESTRY.

WANTED.—A Position as Superintendent on Private Estate. Expert experience with 22 years' backing, on Forestry, Agriculture, Horticulture, Landscape Engineering. Graduate Civil Engineer, Practical Experience in all mentioned work. Will take full responsibility of any estate or construction of an estate and guarantee my work. Fair salary expected. Please state salary you are willing to offer with reply. I will not accept a position in "part." I will not accept position under three months' notice to my present Employer. Address "V. C. P." Care AMERICAN FORESTRY.

YOUNG MAN, 29 years old, wishes position with forest owner or lumber mill concern, to take care of all waste timber. Have 12 years' experience in distilling and extracting by-products from forest wastes, etc. Address 1, Care AMERICAN FORESTRY.

FORESTER wants position with Consulting Forestry firm, or with lumber company or private estate. Training from Michigan Agricultural College and Yale Forest School; four years' experience with U. S. Forest Service and two winters with lumber companies. Acquainted thoroughly with Montana, Idaho and California timber as cruiser. References on request. Address E., Care AMERICAN FORESTRY.

ENERGETIC Post Graduate Forester desires position as an assistant in park or city forestry work. Subordinate duties preferred. Best of references. Address M. M. J., Care of AMERICAN FORESTRY.

FOREST ENGINEER with Forest Service training in Colorado, Wyoming, private work in California, and six years' experience in the lumber industry on the Pacific Coast, would like field work in any part of the United States. Estimating of timber lands and topographic surveying a specialty. Four years' technical training. Address, "D." Care AMERICAN FORESTRY.

FOREST SCHOOL GRADUATE with four years' experience in southern mountains, in lumbering and forestry work, would like position with Forest Engineering Firm or Lumber Company. Address XX., Care AMERICAN FORESTRY.

POSITION WANTED by Graduate Forester and Expert Nurseryman, now in charge of large nursery. Best references. Address, "Nursery," Care of AMERICAN FORESTRY.

WANTED—A position for the summer by a student of Forestry. Experience in planing mills, steam and gasoline machinery, power boats, chaining and rodding for surveyor. Will do anything that requires work. Address Box 8, Care of AMERICAN FORESTRY.

SURVEYS AND MAPS for roads, drains and large tracts of lands. Would like work in the South during the winter months. Will consider offer of steady position. Forest work given special attention. W. B. TIMBRELL, 308 Realty Building, Elmira, N. Y.

WANTED—Timber estimating by postgraduate forester with experience in Eastern Canada and Lake States. References. Address P. T. A., Care of AMERICAN FORESTRY, Washington, D. C.

GRADUATE FORESTER desires position; practical experience in timber estimating, nursery work, also especially qualified for shade tree work; have passed Civil Service examination for forest assistant. Address "D. B.," Care of AMERICAN FORESTRY.

FOREST ENGINEER with training in this country and abroad, will consider position as Secretary of Fire Protective, Forestry or Conservation Association. Thoroughly experienced in Forestry and publicity work, and competent to handle affairs of such organization. Well recommended. Address "SECRETARY". Care of AMERICAN FORESTRY, Washington, D. C.

WANTED—Employment with timber or lumber company in the West by young man of 27, with college education, commercial training and some teaching and business experience, who has spent five seasons—totalling twenty-one months—as Assistant Forest Ranger in the U. S. Forest Service, in the Pacific Northwest. Address 12, Care American Forestry.

WANTED—A job as Fire Guard or anything pertaining to forestry by a young man 19 years old. I am inexperienced but willing to work and learn. Address Box 14, Care of AMERICAN FORESTRY.

Wanted—Trained Forester

With TROPICAL Experience

for work for American interests in Dutch East Indies. State experience and salary expected and when services would be available. Address Box 50, Care of AMERICAN FORESTRY

BILTMORE TEXT BOOKS

The text books of the Biltmore Forest School, written by Dr. C. A. Schenck, continue for sale at Biltmore. For particulars address BILTMORE FOREST BOOKS, Biltmore, N. C. tf

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30,000 selected WHITE and CHESTNUT OAK trees

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For quick sale, the best factory in the South for manufacture of furniture or interior trim. Special advantages in rates, taxes, labor, raw material both yellow pine and hardwoods. Plant is new, fireproof and insurance rate is 66 cents per $100.00. Sale price is less than half the cost. Write for particulars and photographs.

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